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**THOMASON  
CIVIL ENGINEERING COLLEGE,  
ROORKEE, U. P.**



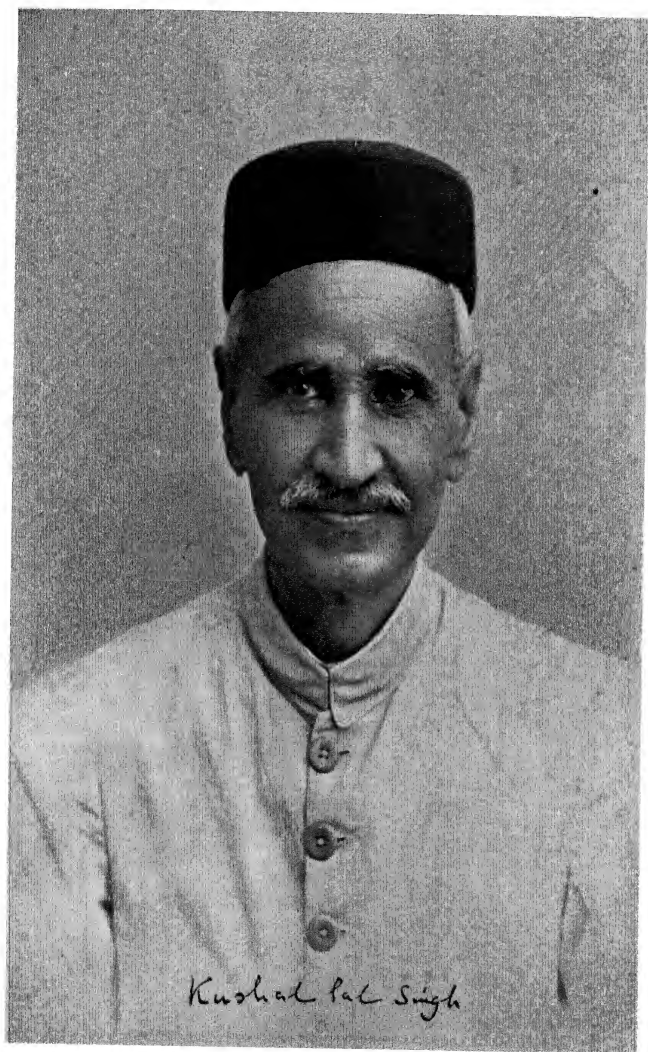
**CALENDAR,  
1929.**











THE HON'BLE RAJA BAHADUR KUSHALPAL SINGH, M.A., LL.B.,  
Minister for Education, United Provinces.  
(Presided at the Thomason College, Convocation, July 1929).

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# THOMSON CIVIL ENGINEERING COLLEGE CALENDAR.

OCTOBER, 1929.

NOVEMBER, 1929.

Date.	Days of the week.	General and Office.	Date.	Days of the week.	General and Office.
1	T	{ Rent Roll to Pay and Accounts Officer, Education Department, United Provinces.	1	F	{ All Saints Day. Rent Roll to Pay and Accounts Officer Education Department, United Provinces.
2	W		2	S	
3	Th		3	S	{ 22nd Sunday after Trinity. Call for latest edition of form of confidential report on R.E. officers
4	F		4	M	
5	S		5	T	
6	S	18th Sunday after Trinity.	6	W	
7	M	{ Dasehra. H.	7	Th	
8	T		8	F	23rd Sunday after Trinity.
9	W		9	S	
10	Th		10	S	
11	F		11	M	
12	S	19th Sunday after Trinity.	12	T	Guru Nanak's Birthday. H.
13	S	Vacation ends. All classes join.	13	W	
14	M		14	Th	
15	T		15	F	
16	W		16	S	
17	Th	20th Sunday after Trinity.	17	S	24th Sunday after Trinity.
18	F		18	M	
19	S		19	T	
20	S		20	W	
21	M		21	Th	25th Sunday after Trinity.
22	T	21st Sunday after Trinity.	22	F	
23	W		23	S	
24	Th		24	S	
25	F		25	M	
26	S	{ Diwali. H.	26	T	
27	S		27	W	
28	M		28	Th	
29	T		29	F	
30	W		30	S	
31	Th				

## DECEMBER, 1929.

Date	Days of the week.	General and Office.
1	S	<i>Advent Sunday.</i>
2	M	{ Confidential Report on R. E. officers. Rent Roll to Pay and Accounts Officer, Education Department, United Provinces.
3	T	
4	W	
5	Th	
6	F	
7	S	
8	S	<i>1st Sunday in Advent.</i>
9	M	<i>Durbar Day.</i>
10	T	
11	W	
12	Th	
13	F	
14	S	
15	S	<i>2nd Sunday in Advent.</i>
16	M	<i>St. Thomas, A. &amp; M.</i>
17	T	
18	W	
19	Th	
20	F	
21	S	
22	S	<i>3rd Sunday in Advent.</i>
23	M	{ <i>Christmas Day.</i> <i>St. Stephen, First Martyr.</i>
24	T	
25	W	
26	Th	
27	F	
28	S	
29	S	<i>Innocents Day.</i>
30	M	
31	T	

## JANUARY, 1930.

Date.	Days of the week.	General and Office.
1	W	<i>New Year's Day.</i>
2	Th	{ Call for term examination question papers. Educational Certificates of students provisionally admitted to be called for. Rent Roll to Pay and Accounts Officer, Education Department, United Provinces. Convictions under Factory Act for the previous year to be sent to the Inspector of Factories.
3	F	
4	S	
5	S	
6	M	<i>Epiphany of our Lord.</i>
7	T	<i>Guru Gobind Singh's Birthday. H.</i>
8	W	{ Term examination question papers to be given in.
9	Th	
10	F	Return No. 1 to be sent to the Inspector of Factories and Boilers, United Provinces.
11	S	
12	S	<i>1st Sunday after Epiphany.</i>
13	M	<i>Shab-i-Barat. M.</i>
14	T	
15	W	
16	Th	
17	F	
18	S	
19	S	<i>2nd Sunday after Epiphany.</i>
20	M	<i>3rd Sunday after Epiphany.</i>
21	T	
22	W	
23	Th	
24	F	
25	S	
26	S	<i>3rd Sunday after Epiphany.</i>
27	M	<i>3rd Sunday after Epiphany.</i>
28	T	
29	W	
30	Th	
31	F	

## FEBRUARY, 1930.

## MARCH, 1930

Date.	Days of the week.	General and Office.	Date.	Days of the week.	General and Office.
1	S	Stationery Indent due from Lecturer in Drawing Rent Roll to Pay and Accounts Officer, Education Department, United Provinces Auction of grazing on College grounds.	1	S	Order forms and rules for Entrance Examination. Rent Roll to Pay and Accounts Officer, Education Department, United Provinces.
2	S	4th Sunday after Epiphany.	2	S	
3	M	Term examination begins.	3	M	Quinquagesima.
4	T		4	T	Id-ul-Fitar. M.
5	W	Basant Panchami. H.	5	W	Ash Wednesday.
6	Th		6	Th	
7	F		7	F	
8	S	Indent of forms to be sent to Director of Public Instruction, United Provinces	8	S	Ask for bill for supply of water from the Executive Engineer, Ganges Canal.
9	S	5th Sunday after Epiphany.	9	S	1st Sunday in Lent.
10	M	Second term begins	10	M	
11	T		11	T	
12	W		12	W	
13	Th		13	Th	
14	F		14	F	
15	S		15	S	Holi. H.
6	S	Septuagesima.	16	S	2nd Sunday in Lent.
17	M		17	M	
18	T		18	T	
19	W		19	W	
20	Th		20	Th	Write to Director-General, Observatories for weather report.
21	F		21	F	
22	S		22	S	
23	S	Sexagesima.	23	S	3rd Sunday in Lent.
24	M		24	M	
25	T		25	T	
26	W		26	W	
27	Th	Sheoratri. H.	27	Th	
28	F	Last Friday of Ramzan M.	28	F	
			29	S	
			30	S	4th Sunday in Lent.
			31	M	



## APRIL, 1930.

## MAY, 1930.

Date.	Days of the week.	General and Office	Date.	Days of the week.	General and Office
1	T	{ Detailed Statement of Establishment sent to Pay and Accounts Officer, Education Department, United Provinces. Rent Roll to Pay and Accounts Officer, Education Department, United Provinces. Arrange for question papers for Entrance examinations being received by 1st May.	1	Th	{ Arrange for question papers for Final examinations being received by 15th instant. Statistical Return. Letters regarding training of Apprentice Overseers sent out. Rent Roll to Pay and Accounts Officer, Education Department, United Provinces. Papers for Entrance examination, Civil Engineer and Overseer Classes.
2	W		2	F	
3	Th		3	S	
4	F	{ Order Medals from Calcutta Mint. Enquire appointments offered for Engineers and Overseers.	4	S	2nd Sunday after Easter.
5	S		5	M	
6	S	5th Sunday in Lent.	6	T	
7	M		7	W	
8	T		8	Th	
9	W		9	F	{ Requisition on Press for Certificates, etc., for prize-giving. Id-uz-Zuha. M.
10	Th		10	S	
11	F		11	S	3rd Sunday after Easter.
12	S	Hardwar Fair. H.	12	M	
13	S	Palm Sunday.	13	T	{ Call for Marking Sheets with names for Principal to fill in marks.
14	M		14	W	
15	T		15	Th	
16	W		16	F	
17	Th		17	S	
18	F	Good Friday.	18	S	4th Sunday after Easter.
19	S		19	M	
20	S	Easter Sunday.	20	T	
21	M		21	W	
22	T		22	Th	
23	W	S. Georges.	23	F	
24	Th		24	S	Empire Day.
25	F		25	S	Rogation Sunday.
26	S		26	M	
27	S	1st Sunday after Easter	27	T	
28	M		28	W	
29	T		29	Th	Ascension Day.
30	W		30	F	
			31	S	

## JUNE, 1930.

Date.	Days of the week.	General and Office.
1	S	Rent Roll to Pay and Accounts Officer, Education Department, United Provinces Annual estimated expenditure on stores from England for coming year to be submitted to D. P. I., United Provinces. Entrance examination, Civil Engineer and Overseer Classes. Revision work in quarters. Schedule of new demands to Director of Public Instruction, U. P. <i>King-Emperor's Birthday.</i>
2	M	
3	T	
4	W	
5	Th	
6	F	
7	S	
		<i>9th Day of Moharram. M.</i>
8	S	Whit Sunday. 10th Day of Moharram. M. Final examinations begin. Circulars for admission to the Classes to be printed.
9	M	
10	T	
11	W	
12	Th	
13	F	
14	S	
15	S	<i>Trinity Sunday.</i>
16	M	
17	T	
18	W	
19	Th	
20	F	
21	S	
22	S	<i>1st Sunday after Trinity.</i>
23	M	
24	T	
25	W	
26	Th	
27	F	
28	S	
29	S	<i>2nd Sunday after Trinity.</i>
30	M	

## JULY, 1930.

Date	Days of the week.	General and Office.
1	T	Rent Roll to Pay and Accounts Officer, Education Dept., United Provinces. Fees paid to examiners.
2	W	
3	Th	
4	F	
5	S	
6	S	<i>3rd Sunday after Trinity.</i>
7	M	
8	T	
9	W	
10	Th	
11	F	
12	S	Budget to be sent to Director of Pub Instruction, United Provinces.
13	S	
		<i>4th Sunday after Trinity.</i>
14	M	
15	T	
16	W	Vacation commences. Corrected copy of calendar to be sent to Press for printing.
17	Th	
18	F	
19	S	
20	S	<i>5th Sunday after Trinity.</i>
21	M	
22	T	
23	W	
24	Th	
25	F	
26	S	
27	S	<i>6th Sunday after Trinity.</i>
28	M	
29	T	
30	W	
31	Th	

## AUGUST, 1930.

Date.	Days of the week.	General and Office.
1	F	{ Statement of non-gazetted officers over 55 years of age or attaining that age to be submitted to Director of Pnb. Instruction. Rent Roll to Pay and Accounts Officer, Education Dept., United Provinces
2	S	
3	S	7th Sunday after Trinity.
4	M	Bara Wafat M.
5	T	
6	W	
7	Th	
8	F	
9	S	
10	S	8th Sunday after Trinity.
11	M	
12	T	
13	W	
14	Th	
15	F	
16	S	
17	S	9th Sunday after Trinity.
18	M	
19	T	
20	W	
21	Th	
22	F	
23	S	
24	S	10th Sunday after Trinity.
25	M	
26	T	
27	W	
28	Th	
29	F	
30	S	
31	S	11th Sunday after Trinity.

## SEPTEMBER, 1930.

Date.	Days of the week.	General and Office.
1	M	{ Rent Roll to Pay and Accounts Officer, Education Department, United Provinces.
2	T	
3	W	
4	Th	
5	F	
6	S	
7	S	12th Sunday after Trinity.
8	M	
9	T	
10	W	
11	Th	
12	F	
13	S	
14	S	13th Sunday after Trinity.
15	M	
16	T	
17	W	
18	Th	
19	F	
20	S	
21	S	14th Sunday after Trinity.
22	M	
23	T	
24	W	
25	Th	
26	F	
27	S	
28	S	15th Sunday after Trinity.
29	M	
30	T	

OCTOBER, 1930.

NOVEMBER, 1930.

Date.	Days of the week.	General and Office
1	W	<i>Dussehra. H.</i> Rent Roll to Pay and Accounts Officer, Education Department, United Provinces.
2	Th	
3	F	
4	S	
5	S	16th Sunday after Trinity.
6	M	
7	T	
8	W	
9	Th	
10	F	
11	S	
12	S	17th Sunday after Trinity.
13	M	
14	T	
15	W	Vacation ends.
16	Th	Classes join.
17	F	
18	S	
19	S	18th Sunday after Trinity.
20	M	
21	T	<i>Diwali. H.</i>
22	W	
23	Th	
24	F	
25	S	
26	S	19th Sunday after Trinity.
27	M	
28	T	
29	W	
30	Th	
31	F	



## THOMASON CIVIL ENGINEERING COLLEGE.

### ADVISORY COUNCIL OF THE THOMASON COLLEGE.

1. JWALA PRASADA, Esq., I.S.E., CHIEF ENGINEER AND SECRETARY TO GOVERNMENT, IRRIGATION BRANCH, PUBLIC WORKS DEPARTMENT, UNITED PROVINCES, (PRESIDENT.)
2. P. H. TILLARD, Esq., I.S.E., CHIEF ENGINEER, BUILDINGS AND ROADS BRANCH, PUBLIC WORKS DEPARTMENT, UNITED PROVINCES.
3. *Vacant.* REPRESENTATIVE OF THE INSTITUTION OF ENGINEERS, (INDIA).
4. THE DIVISIONAL SUPERINTENDENT, EAST INDIAN RAILWAY, LUCKNOW.
5. THE DIRECTOR OF PUBLIC INSTRUCTION, UNITED PROVINCES.
6. THE DIRECTOR OF INDUSTRIES, UNITED PROVINCES.
7. THE PRINCIPAL, THOMASON COLLEGE, ROORKEE, (SECRETARY.)
8. DR. GANESH PRASAD, M.A., D.SC., M.L.C., NOMINEE OF UNIVERSITY OF ALLAHABAD.
9. J. P. SRIVASTAVA, Esq., M.SC., M.L.C., NOMINEE OF THE UPPER INDIA CHAMBER OF COMMERCE.
10. I. D. VARSHANI, Esq., NOMINEE OF THE UNITED PROVINCES CHAMBER OF COMMERCE.
11. RAJA RAM, Esq., PROFESSOR OF CIVIL ENGINEERING (SANITARY,) THOMASON COLLEGE, ROORKEE.
12. KHAN BAHADUR A. H. MIRZA, ELECTED BY THE NON-OFFICIAL MEMBERS OF THE BOARD OF INDUSTRIES, UNITED PROVINCES.
13. MAULVI ZAHUR-UD-DIN, B.A.,  
LL.B., M.L.C., BAREILLY.
14. PANDIT NANAK CHAND, M.A.,  
LL.B., M.L.C., BULANDSHAHR.

*Representatives of the  
U. P. Legislative  
Council.*

## COLLEGE STAFF.

16th October, 1929.

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LIEUT.-COLONEL E. W. C. SANDES, D.S.O., M.C., R.E., M.I.E., (IND).,  
Principal.

---

### DEPARTMENTS.

#### Civil Engineering.

G. LACEY, B.Sc. (Eng.) A.M.I.C.E., Professor of Civil Engineering.  
I.S.E.,

MOHSIN ALI, B.A., M.Sc., I.S.E., ... Professor of Civil Engineering.

RAJA RAM, B.Sc., A.M.I.C.E., F.I.S.E., Professor of Civil Engineering,  
M.I. MUN. & CY. E., A.M.I.E., (Ind.). (on leave).

PHUMMAN RAM, ... Instructor in Civil Engineering,  
Overseer Class.

ABDUS SATTAR KHAN, ... Instructor in Civil Engineering,  
Overseer Class.

#### Pure and Applied Mathematics.

B. D. PURI, M. A (Cantab), ... Professor of Pure and  
Applied Mathematics.

PARMANANDA CHAKRAVARTI, M.Sc., M.A., Lecturer in Mathematics.

PROBODH CHANDRA SEN GUPTA, B.Sc., ... Lecturer in Mathematics.

NATHA SINGH, ... Instructor in Mathematics.

**Surveying and Drawing.**

C. J. VEALE, F.R.A.S. F.R.G.S., Professor of Surveying and Drawing.

*Vacant*, ... ... Lecturer in Drawing.

LIEUTENANT J. S. GURNEY, F.S.I., Headmaster and Instructor in  
M.R.S.I., ... ... Surveying, Overseer Class.

H. T. CUMMING, A.M.I.E. (IND.), Lecturer in Surveying and Drawing.

RAM SAHAI, ... ... Instructor in Drawing, Overseer Class.

PRITAM DAS, ... ... Instructor in Surveying and Drawing,  
Overseer Class.

**Applied Science.**

DR. P. P. PHILLIPS, PH.D., Professor of Applied Science and  
(GÖTTINGEN) F.I.C., I.E.S., ... Officer-in-charge Civil Engineer  
Class.

ANAND SARUP, M.SC., A.M.A.I.E.E., Lecturer in Physics.

KRISHNA LAL BHATTACHARYA, ... Lecturer in Chemistry.  
M.SC.,

**Mechanical and Electrical Engineering.**

MAJOR A. M. McLEAN, M.C., Assistant Professor of Mechanical  
A. M. I. MECH. E., ... and Electrical Engineering.

J. CRAWFORD, ... ... Lecturer in Mechanical Engineering.

MUNNA LAL MISRA, A.M.I.E., (IND.), Lecturer in Electrical Engineering.

DHANPAL CHANDRA, ... ... Lecturer in Mechanical Engineering.

SADHU SINGH, ... ... Foreman Carpenter.

ASA RAM, ... ... Foreman Moulder.

ABDUL RAHIM, ... ... Foreman Mechanic.

BHAGWAN DAS, ... ... Foreman Blacksmith.



**Photo.-Mechanical Press.**

DIAL DAS MEHTA,	...	Superintendent, Photo.-Mechanical Press.
W. J. PEYCHERS, ...	...	Assistant, Photo.-Mechanical Press.
<i>Vacant</i> , ...	...	Assistant Photo.-Mechanical Press.
RAGHUNANDAN LAL,	...	Instructor. Draftsman Class.

**Office.**

KUNDAN LAL, ...	...	Superintendent.
HIRA LAL, ...	...	Head Clerk.
MOHAN LAL, ...	...	Assistant Accountant.
SAMPAT RAI, ...	...	Curator, Book Depôt.

*Librarian.**Vacant.**Personal Assistant.*

CONDR. J. BARNETT.

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## GENERAL DESCRIPTION OF THE THOMASON COLLEGE.

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THE Thomason College is a provincial institution maintained and controlled by the Government of the United Provinces, but students are admitted, under certain conditions, also from the Punjab, Central Provinces, Central India and Rajputana, and Burma, the Governments of these provinces paying the cost of training their students. A few students are admitted annually from certain Indian States under special conditions. Every candidate for entrance is required to produce certain educational and other certificates before he is permitted to appear in the annual competitive entrance examination of his class. The competition is keen. Candidates are not admitted from the provinces of Bengal, Bombay or Madras, as these provinces have their own engineering colleges. Full details of the conditions of admission to the Thomason College appear in the Circulars of the various classes, obtainable from the College. These Circulars are included in this Calendar.

The Thomason College now admits successful and fully qualified candidates to the following classes :—

- (a) Civil Engineer Class.
- (b) Overseer Class.
- (c) Draftsman Class.

The Course of Study in the College for each of these classes is given in the Course of Study and Syllabus pamphlet of the class. These pamphlets are obtainable, on payment, from the College Book Depôt, and are included in this Calendar. The Civil Engineer Class course is of three years' duration, and candidates for it must not be under 17 or above 21 years of age on the 1st June immediately preceding the competitive entrance examination which is held annually in June. *This rule is very rigidly enforced.* The Overseer Class

course is of two years' duration, and the age limits in this case are 16 and 21 years under the same conditions. The Draftsman Class course is usually of three years' duration, and there are no age limits; the qualifying educational standard for the entrance examination of the Draftsman Class is much lower than for the other classes, and the entrance examination standard also is lower.

The Civil Engineer Class course approximates to the degree standard in engineering of a British University. The Thomason College grants a diploma (certificate) on the successful completion of this course. The first year of the course is devoted mainly to pure mathematics and science, the second year chiefly to more advanced pure and applied mathematics, science, surveying, and some civil, mechanical and electrical engineering, and the third year almost entirely to civil engineering (including designs), with the addition of more mechanical and electrical engineering and surveying (including astronomy). An important test of a student's practical ability takes place in the third year, in which, after two preliminary projects which are corrected and criticized, a two months' engineering project is set by an outside examiner in Irrigation design or in some other branch of engineering design. The third year students go into camp for the first portion of this project period and each student works alone across country with his own instruments (theodolite, level and plane-table) and his gang of men, returning to Roorkee to complete his reports, designs, calculations, estimates and survey plates when he has finished his work in the field. This test, which carries a large number of marks, effectually eliminates the pure theorist from the upper half of the class, and brings to the fore the man of common sense, ability, character, and initiative. The Overseer Class students also execute a small project in Roorkee to test their practical ability. Before the end of each session, in June, there is a final examination, in which every student must qualify in the various groups of subjects studied during the session if he wishes to remain in the College. Mid-session examinations also are held in February. The College session begins on the 16th October and ends on the 15th July, being followed by a vacation of three months during the unhealthy monsoon period when out-door work would be impossible. At Christmas 10 days' leave are given.

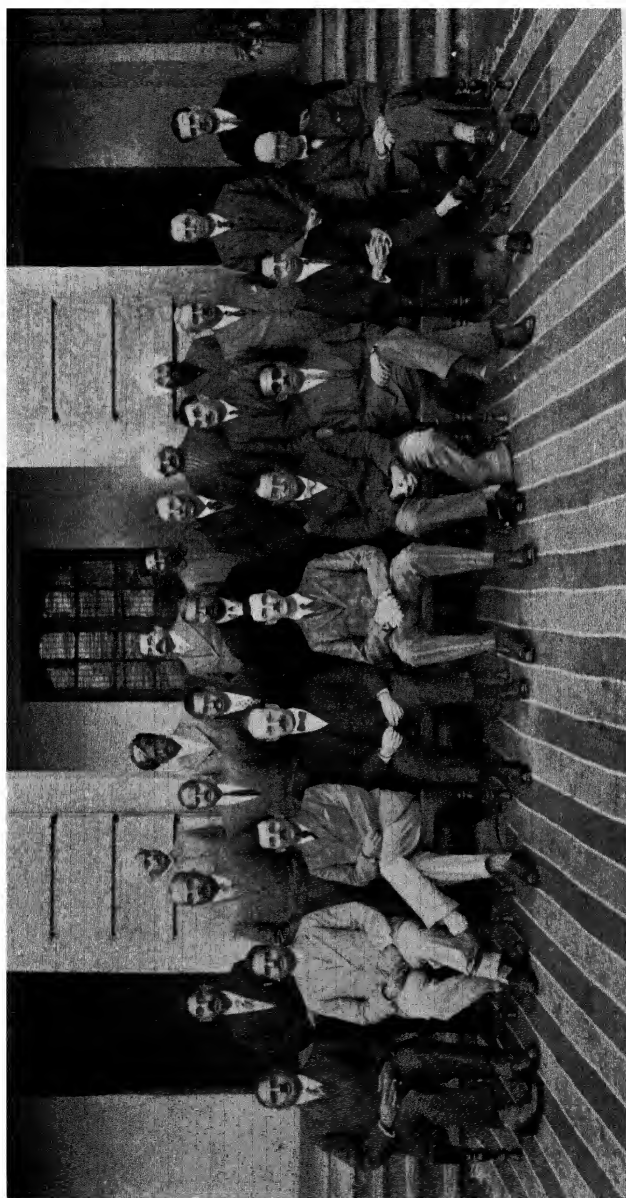
The College grants either a 'Higher' or an 'Ordinary' Certificate to students, who successfully complete the College course, according to their totals of marks. A successful Civil Engineer Class student, if he secures an appointment in Government service, is usually posted as an apprentice (or student) to the Public Works Department for one year to learn practical methods of work and the control of labour. At the end of this year, if his reports are good, he is posted to the Public Works Department as an Assistant Executive Engineer, or an Assistant Engineer, on probation for another year. The more brilliant men usually enter the Indian Service of Engineers and others the Provincial Engineering Service of their Province, or Indian State Service, while one or two may be posted to Indian Railways. Successful students from the Overseer Class may enter the Subordinate Engineering Service of their Province, if vacancies exist, after a satisfactory period of practical training and probation of two years' duration as for the Civil Engineer Class men, or they may obtain other employment. An employment register is maintained for the benefit of any men who do not obtain employment, or are out of employment.

The probable current monthly expenses of a student are shown at end of the Circular of each class. It will be seen that the expenses of a Civil Engineer Class Indian student should not exceed Rs. 122/12/- per mensem while the College is open, and, of a European student, Rs. 177/- per mensem, and these figures include a College fee of Rs. 24/- per mensem and charges for rent, conservancy, furniture, recreation, servants and messing; but a Final Examination fee of Rs. 40/- is also required before a student leaves the College. The expenses of an Overseer Class Indian student are estimated at Rs. 42/- per mensem, including a College fee of Rs. 6/- per mensem. A number of scholarships are awarded in the Civil Engineer Class and Overseer Class.

The Photo.-Mechanical and Litho. Department of the Thomason College (the College Press) is located in a portion of the main building and is under the orders of the Principal, though administered directly by a Superintendent. It is a commercial concern of Government, employing trained and paid workmen, but College students can undergo an optional course in Photography in the Press and are also

trained in Process Work by the Superintendent. The Department carries out lithographic, photographic and other work for Government departments in India, as well as for private individuals, and its profits are credited to Government

The Thomason College main building is large and spacious, and has laboratories, class rooms, and model rooms for the various departments. The equipment of instruments and apparatus is complete and up to date. The College Workshops are also well fitted with machinery and apparatus. The College has its own Dairy, Hospital, Book Depôt, and Meteorological Observatory, and an electrical supply system giving current for electric lights, fans and motors in the main building and some other buildings. The drinking water is pumped direct from enclosed wells into overhead reservoirs, while water for gardens and grounds is obtained from the Ganges Canal through a separate pipe system. All the pumps are operated electrically. The Civil Engineer Class and Overseer Class students, and some of the Draftsman Class students, live in Hostels grouped in rear of the College, and each student of the former class has a furnished room and bathroom. The Civil Engineer Class Indian students have a Club, and the European students a Mess. Most of the staff have detached bungalows with gardens. A plan of the College, and a map of the Estate, appear at the end of this Calendar. Many facilities for recreation are provided for the students, *i.e.*, a number of tennis courts, squash racquets courts, a football ground, hockey grounds, a cricket ground, and a large Boat Club on the Ganges Canal with rowing and sculling boats from Oxford. The students are encouraged to take part in all games and sports in order to fit them for their profession, and for their own benefit. Athletic Sports and a Regatta are held annually, and all Civil Engineer Class students are now enrolled in the Indian Auxiliary Force, or the University Training Corps, for military training, while the Overseer Class students perform physical drill under a military instructor.



COLLEGE EDUCATIONAL STAFF, 1928.



## HISTORY OF THE THOMASON COLLEGE.

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The Thomason College, the oldest engineering college in India, owes its birth to the waters of Mother Ganges. Without the River Ganges there would have been no canal of that name, and, without the canal, no college at Roorkee. The Ganges Canal soon reached maturity, but its offspring, the Thomason College, planned by men of wisdom and foresight, grew steadily from the smallest beginnings till it attained the proud position which it now holds as one of the leading educational institutions of the East with great traditions and a reputation second to none.

The establishment of an engineering college at Roorkee was suggested to the Honourable James Thomason, Lieut.-Governor of the N.-W. Provinces, about 1846, by Colonel Cantley of the Bengal Engineers, who had been Superintendent-General of Canals since 1836 and was busily engaged in the scheme, first contemplated by Colonel Colvin of the same Corps, for the employment of the waters of the Ganges for irrigation. While there is no doubt that the immediate requirements of the Ganges Canal in engineer officers and subordinates were chiefly responsible for the foundation of the Thomason College, it is probable that broader issues also influenced the minds of Mr. Thomason and his advisers, and that an important point was the necessity for some systematic training for Civil Engineers in India, or at least in Northern India. The Western Jumna Canals were commenced in 1817, and the Eastern Jumna Canal in 1822, and in 1847 the annual expenditure on establishments for these undertakings was Rs. 1,04,000, and on annual repairs Rs. 85,000. In Dehra Dun, Rohilkhand, and near Delhi, works for drainage and irrigation were maintained requiring skilful superintendence. The roads from Jubbulpur to Mirzapur, the



grand-trunk roads from Calcutta to Delhi and from Agra to Bombay, and the Land Revenue Settlement Survey, had been completed. It was apparent that there existed a large demand for skill in every branch of Civil Engineering. To meet this demand there were officers of the Army, European non-commissioned officers and soldiers, and there were Indians. To make these men efficient agents, the well-educated Europeans, lately arrived in the country, required instruction in Indian languages, and in the peculiarities of materials and construction in India. The European soldiers required scientific instruction, and the Indians, from their local experience and ability to bear exposure to the climate, were likely to prove efficient instruments if they were well taught and inspired with a proper sense of responsibility.

As early as the year 1845, Lieutenant Baird-Smith, of the Bengal Engineers, then Superintendent of the Eastern Jumna Canal, began training young Indians at Saharanpur in Civil Engineering for the grade of Sub-Assistant Executive Engineer, and in 1846, twenty candidates were admitted to this class. In 1847, after the First Punjab War, Lord Hardinge, the Governor-General, determined on the vigorous prosecution of the Ganges Canal scheme. This undertaking, especially in the first few miles of its course, was beset with great engineering difficulties. Evidently it would tax to the utmost the skill, industry, and resources of the people and of the country. The science that was necessary to construct a work of this magnitude would also be kept constantly in exercise for its maintenance, improvement, and extension. Immediate measures were necessary to provide a constant supply of well-trained and experienced Engineers, and out of this emergency, the Roorkee College arose, later to be known as the Thomason College. The circumstances which caused the selection of Roorkee as the site for the College were thus stated in the proposal made to the Governor-General on September, 23rd, 1847 :—

“The establishments now forming at Roorkee, near the Solani Aqueduct on the Ganges Canal, afford peculiar facilities for instructing Civil Engineers. There are large workshops, and most important structures in course of formation. There are also a library and model room. Above all, a number of scientific and experienced officers are constantly assembled on the spot, or occasionally resorting thither.

These officers, however, all have their appropriate and engrossing duties to perform, and cannot give time for that careful and systematic instruction which is necessary for the formation of an expert Civil Engineer. On these accounts the Lieutenant-Governor would propose the establishment at Roorkee of an institution for the education of Civil Engineers, which should be under the direction of the Local Government in the Education department."

The proposal obtained the immediate and cordial support of the Governor-General in India. On October 19th, 1847, Lieutenant R. Maclagan, of the Engineers,\* was appointed Principal of the College, and on November 25th of the same year a prospectus was issued, the establishment being fixed at a Principal, a Head Master, an Architectural Drawing Master, and two Indian Teachers. The prospectus provided for three departments in the College. The First Department was for candidates for appointment as Sub-Assistant Civil Engineers. It was laid down that they must be under 22 years of age, must be able to read and write English easily, and must have a knowledge of Geometry, Algebra, Mensuration, Plane and Spherical Trigonometry, Conic Sections, and Mechanics, and the number to be admitted was 8 annually. The Second Department was for European Non-commissioned Officers and soldiers who had to pass an elementary test in Reading, Writing, simple Drawing and very easy Mathematics before admission. The number of admissions was limited to 10 annually, and these soldiers were trained to become Overseers in the Public Works Department. The Third Department was for young Indians desiring free instruction in Surveying, Levelling and Drawing. These men were required to have some knowledge of Arithmetic and to be able to read and write Urdu. Admissions were limited to 16 annually, and qualified men were given certificates on leaving the College. Annual examinations were held for all classes. It will be noticed that the lengths of the courses were not specified, but it is believed that the Second Department course lasted 6 months only.

When Lieut. R. Maclagan was appointed as Principal in October, 1847, not only were there no students, but there was no College.

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\* Father of Sir Edward Maclagan, Governor of the Punjab.

The first students were admitted on 1st January, 1848, by the transfer of a few young Indians, who were being instructed by Major W. E. Baker of the Bengal Engineers, then Director of the Ganges Canal. These men apparently joined the Third Department. By August 1848, ten non-commissioned officers and soldiers had joined the Second Department which was then complete, but meanwhile, as no building was available, work was carried out in tents. A very small building, the fore-runner of the present Thomason College, was built for use during the hot weather of 1848 and was demolished later when better accommodation was provided in the new College buildings. This little building contained 2 class rooms (26'  $\times$  32'), a Principal's Office 20'  $\times$  23', a Hall of the same size, and 4 small verandah corner rooms (16'  $\times$  12') for the Headmaster, Drawing Master, Book Depôt, and Store, with verandahs on all sides. A plan of this miniature College—known then as the Roorkee College—hangs in the Thomason College corridor. The site of the building is unknown, but presumably it was near the site of the existing College, possibly where the Principal's residence now stands. Instructional work was interrupted, in the winter of 1848-49, by the Second Punjab War, when Lieut. MacLagan and the military students were absent on service for about two months, or, as it was tersely put, "marched for the frontier."

The year 1848 was an important one in the history of Roorkee. In this year, 12 years after the first line of the Ganges Canal levels had been taken, Lord Hardinge, then Governor-General, recommended the commencement of work on the Canal scheme with the utmost vigour, and the Ganges Canal may be said to originate from that time. The Canal Foundry Workshops were also established at Roorkee by Major Allen of the Bengal Army, in that year, and students of the Roorkee College attended there for practical instruction. In 1850, the number of Military students admitted to the College was increased to 15 annually, and, on 7th April, 1851, there were 50 students of all classes and 42 men had already passed out.

The year 1851 really marks the birth of the Thomason College as it now is. At the end of the Second Punjab War, the Roorkee College, with its then existing establishment and accommodation, was

barely adequate for the instruction of the students, and was utterly inadequate to meet the exigencies of the occasion. Mr. Thomason at once grasped the situation and prepared a scheme for enlargement.

This scheme provided for :—

*1st*—The admission of officers, both of the Royal and East India Company's armies, to study at Roorkee in a class called the Senior Department.

*2nd*—The superintendence and improvement of the village schools around Roorkee, as feeders for the Third or Indian Department of the College.

*3rd*—The establishment, in connection with the College, of a *Depôt* for Mathematical and Scientific instruments, and of a workshop for their repair and manufacture.

*4th*—The formation of a Museum of Economic Geology.

*5th*—The erection of an Observatory for instruction.

*6th*.—The maintenance of metal and stone Printing Presses with a book-binder's establishment, and all the necessities for the publication of scientific works with appropriate drawings and illustrations.

*7th*—The enlargement of the College buildings and establishment to meet all these purposes.

*8th*—The doubling of the number of students in the Second and Third Departments.

The original cost of the College buildings, etc., was estimated at Rs. 1,56,217, and the annual charge for the College at Rs. 83,898.

A valuable record of the origin of the Thomason College, and the aims and objects for which it was established, is to be found in a pamphlet, dated October 3rd, 1851, drawn up by Mr. Thomason, Lieutenant-Governor of the North-Western Provinces. The exact date of the commencement of the construction of the new College—afterwards called the Thomason College—is unknown, but it seems that the work must have been started in 1852. The officer who designed the main building was Lieutenant Price of the 1st Fusiliers, then employed on the Ganges Canal, who later became Chief Engineer, Hyderabad. There is reason to believe that Lieutenant Price

also supervised the work of construction, *vide* Frontispiece, Volume III., of Colonel Cautley's Report on the Ganges Canal. It is very remarkable that a junior Infantry Officer should have been capable of designing and building so large an edifice as the Thomason College, and producing an example of Renaissance architecture which seems to be not unpleasing even to the eyes of professional architects who have visited Roorkee in modern times. The officers responsible for the selection and acquisition of the site for the Thomason College and its estate showed wonderful judgment and foresight. They acquired in time 365 acres of land, including the high ground on which the College itself was built facing the north, in which direction the main range of the Himalayas towers in snowy grandeur above the nearer hills and lesser ranges. The land was fertile, the water-supply ample, and the locality healthy, while, within a mile or two, some of the greatest engineering works in the world were in the process of construction. It is recorded that the construction of the College was nearing completion in 1854, and that all the original buildings, including the main building, were completed in January, 1856, so that a period of about 4 years was required for the work. The front of the main building, viewed from the north, was as it is at the present day, except that there was no clock; but there were no rooms where the present Library and Convocation Hall exist—only covered passages—and the rear of the quadrangle was open except for a small model room and museum block in the centre. As time went on the College was enlarged. By 1873, the Library and Convocation Hall had been built, and by 1896, the rear of the College had been closed by providing rooms for Science Departments, while still later a second storey was added over the south-east corner to accommodate the Photo. School of the College Press. Nevertheless it can be said that the Thomason College was completed, as then required, in January, 1856, though the site had not the beautiful trees which now provide welcome shade around its lawns and gardens.

Until the year 1854, the institution at Roorkee continued to be known as the "Roorkee College." but in that year the Honourable Court of Directors instituted a scholarship to be called the Thomason Scholarship, in memory of Mr. Thomason, and the Governor-General ordered the Roorkee College to be called the "Thomason College of

Civil Engineering" in the following notification:—

No. 6.

OUR GOVERNOR GENERAL OF INDIA IN COUNCIL.

PUBLIC DEPARTMENT.

*London, 8th February, 1854.*

1. We entirely concur in the opinion you express, that it becomes the Government of India to institute some enduring memorial of the eminent merits and services of Mr. Thomason, and we think that the object cannot be accomplished in a more appropriate manner than by connecting it with the College of Civil Engineering at Roorkee.

Letter, dated 4th November, No. 80 of 1853 Submitting for Court's sanction a proposal for the foundation of a scholarship or prize at the Roorkee College, in memory of the late Mr. Thomason.

2. We approve the proposal you have submitted to us, and authorize you to carry it out in such a way as may seem to you most suitable. At the same time, we are of the opinion that the opportunity should be taken of marking our sense of Mr. Thomason's public services, and of connecting his memory with Roorkee College in a still more emphatic manner. It appears to us very fitting that an institution of such peculiar importance to India, and of a character so entirely novel in that country should bear the name of its founder, and it is accordingly our desire that *the College be henceforth designated the "Thomason College of Civil Engineering at Roorkee."*

3. We direct that this change of name, and the reasons for it, be publicly notified in such form as you deem most suitable.

We are, etc.,

(Sd.) RUSSELL ELLICE,  
J. OLIPHANT,  
and other Directors.

In 1856, when the Thomason College had been built, a Committee was appointed by the Lieut.-Governor to enquire into the past working and present condition of the College, and to prepare a scheme for its extension to meet the demands of the Services. The recommendations of this Committee, most of which were approved in November, 1857, were not put into force at that time owing to the disorganization caused by the Indian Mutiny, but the more important alterations were carried out in the next year or two. These were as follows :—

1. A fixed date was introduced for admission to the Senior Department (Commissioned Officers), and the number for this department was fixed at 16.

2. First Department.—The non-stipendiary students were now styled the *English Class*, and their number fixed at 10. A general educational test was prescribed in addition to the mathematical test at the entrance examination. The stipendiary students were termed the *Native Class*, and an entrance test similar to that for the English Class was exacted. Students of the First and Senior departments were eligible for appointment as Probationary Assistant Engineers.

3. Second Department.—*Military Class*.—The number of students was fixed at 30. The course, however, was only for one year against two in the other departments.

*Non-Military Class*.—No alterations were proposed for this Class, but Indian students were now admitted.

4. Third Department.—*Vernacular*.—Various alterations in the syllabus, and the requirement of a knowledge of English, were prescribed for this department.

5. An evening class for Indian workmen in Drawing, Geometry and Estimating was started.

6. A Professor of Surveying was added to the staff, who was made Curator of the Instrument Depôt; also a Professor of Practical Chemistry and Photography.

7. A College Museum was started, with models from England.

8. An Observatory was sanctioned.

9. A Gymnasium was sanctioned, but was not provided till later.

10. A soldiers' garden, and the grounds generally, were laid out and improved.

11. The Press was re-organized and enlarged.

12. The young officers and non-commissioned officers and privates of the Sappers, stationed at Roorkee, were required to attend the College as far as their duties would admit.

Colonel R. MacLagan, R.E., the first Principal, retired in 1860, being succeeded by Captain E. C. S. Williams, R.E., who, in turn, was succeeded by Major J. G. Medley, R.E., in 1863. The latter held the post of Principal till 1870. For a few years there were no great changes, but the College was expanding steadily. In 1863, when the number of students had risen to 88, a Professor of Experimental Science was appointed. In 1864, the College was affiliated (nominally) to the Calcutta University. The course for the Senior and First Departments was extended to three years, unless a higher certificate was gained in two years. Eight students were guaranteed appointments as Assistant Engineers, and practically all officers from the Senior Department got employment. Second Department students still remained only one year in the College and passed into the Public Works Department, Military students as 1st Grade, English Civilians as 1st or 2nd Grade, and Indians as 3rd Grade. In 1866, a Mistry Class was formed, and also an Officers' Surveying Class for a 7 months' course in Military Surveying, Drawing and Field Engineering. In 1868, an Indian Military Class (3rd Department) joined the College for a 2 years' course. The names of the various classes were altered in 1870 by which time there were 231 students. The Senior Department became the "*Engineer Class*" (Military and Civil), while the Second Department became the "*Upper Subordinate Class*," and the Third Department the "*Lower Subordinate Class*." By 1870, the Staff had greatly increased and consisted of a Principal, two Assistant Principals, a Professor of Experimental Science, and a Professor of Drawing. These officers were assisted by a staff of masters for the Upper Subordinate Class under a Head Master, and another staff for the Lower Subordinate Class. The increase in the number of students, and in the strength of the staff, between the years 1863 and 1870 was remarkable. By 1870, the Thomason College had become a large and important institution, but very few Indians of good education entered it; indeed, between 1847 and 1873 only 17 Indians passed out from the Engineer Class or its equivalent, the remainder being Europeans.



Major A. M. Laug, R.E., replaced Colonel J. G. Medley, R.E., as Principal in 1871, and in the following year the Upper Subordinate Class course—up to then lasting one year only—was extended to two years. In 1873, the Central Instrument Depôt, located in the College, was transferred to the Canal Foundry Workshops, and a new Class for instruction of men of the Guides Corps in Surveying and Drawing was started. About the year 1873, it became apparent that at last the more highly educated Indians had begun to realize the advantages of the Engineer Class, in which they could obtain an excellent education *gratis*, with the chance of a provision for life in a well-paid and honourable profession. This is shown by the fact that, between 1873 and 1875, sixteen Indians passed out of the Civil Engineer Class.

The history of the College, since its establishment, may be said to be divided into four periods, and the year 1875 marked the close of the first period. The chief characteristic of this period was the pecuniary aid given by the Government to most students in the way of stipends. It was an era of pioneering in an untrodden country, and Government had to bear the cost of the journey. But it was also a period of great industrial development, and of great activity in the construction of railways, canals, roads, and other aids to industrial enterprise. The public mind was opening to the benefits of public works, and to the advantages of Engineering as a profession. The result was that in 1875 Government found it possible to restrict the financial help previously given to students, and to limit the number of guaranteed appointments to the Public Service. The years 1875 to 1896 may be termed the second period. During these years, though the pecuniary aid given to students was to a large extent done away with, most of them paid practically nothing for their education. The training, however, was confined chiefly to Civil Engineering, Surveying, and allied branches, and technical or industrial classes did not exist. The years 1896 to 1920 may be called the third period when all students, except soldiers, paid fees, and the College was developed greatly as a Technical Institute, much stress being laid on Industries and Science. From the year 1920 to modern times may be considered as the fourth period when the College reverted once more to the specialized training of Civil engineers and subordinates, relinquishing Industrial, and Mechanical and Electrical, classes which were found to interfere with the more

advanced training in Civil Engineering necessitated by modern conditions and were unsatisfactory in a non-Industrial centre such as Roorkee.

The Royal Indian Engineering College, at Cooper's Hill in England, which opened in 1871 and closed in 1906, had an unfortunate effect on the entry of students to the Engineer Class at Roorkee after 1876. While 55 admissions to this class were made in 1876, only twenty were made in 1878, but the effect of Cooper's Hill College decreased later when more Indians appeared as candidates for entry. An entrance examination fee of Rs. 20/- was required for the first time in 1876. In 1878, Major A. M. Brandreth, R.E., succeeded Colonel A. M. Lang, R.E., as Principal. In 1881 the Guides Corps Class was thrown open to the whole Indian Army, and was called the Native Military Survey Class. In this year also, for the first time, marks were allotted for physical fitness and for proficiency in athletics. From the commencement of 1882 the entire financial responsibility for the College was thrown on the Local Government. Under orders of the Secretary of State no Europeans, except Royal Engineers, were to be appointed as engineers in India, except under his sanction, it being understood that Cooper's Hill College was to be the source whence they were to be recruited. Indians of pure Asiatic descent were to be given all vacancies in the Public Works Department, irrespective of the position they held after the final examination, European competitors only receiving, under special sanction, appointments for which Indians were unable to qualify. This provision was altered in 1886 when guaranteed appointments were thrown open to all Statutory Natives of India. The Professorship of Experimental Science was abolished, and considerable reductions made in the staff, due probably to an anticipated permanent reduction in the number of Engineer Class students.

Few events of importance seem to have occurred in the Thomason College between the years 1882 and 1894, except the abolition of the Military Section of the Lower Subordinate Class in 1885, the starting of a British Military Survey Class in 1888, and some changes in the Staff. Colonel A. M. Brandreth, R.E., retired in 1891 being succeeded as Principal by Colonel F. D. M. Brown, V.C. of the Indian Staff Corps; but the latter officer vacated in 1892 when Major J. Olibborn became Principal. The year 1894, however, is notable for the

fact that in that year the last men for many years passed out of the Engineer Class into the Imperial Service. The Provincial Service was formed, and the Thomason College, having been a provincial institution since 1882, all men from the Engineer Class entered the Provincial Service from 1894. This must have affected the entry to the College. In 1895, educational qualifying tests were introduced for permission to sit for the entrance examinations.

In 1896 commenced the third period in the history of the College. The Lieut.-Governor of the North-Western Provinces visited the institution. The College was reorganized, and from this time forward all students, except soldiers, paid fees for their education. This further extension of the commercial principle, far from injuriously affecting the College, added to its efficiency and activity. The number of applicants for admission exceeded the number who could be accommodated, and it became necessary to insist on a process of selection, whereby only those who stood highest in the competitive examination could be admitted. From this time forth the College did not alone concern itself with the education of engineers and their subordinates : its scope was extended so as to include Industrial and Technical education generally, *the aim being to develop the College into a Technical Institute for the Provinces*, which should control, stimulate, and inspire technical teaching of all kinds.

The main points of this reorganization were :—

*Firstly.*—*The transfer of the administration of the College from the control of the Public Works Department to that of the Education Department*—thus emphasizing the fact that the College was not only intended as a nursery for the Public Works Department, but also to supply the need for Technical education for the Provinces in general.

*Secondly.*—*The extension of the course of students in the Engineer Class from two to three years, in addition to an apprentice year in the Public Works Department as Engineer students*, before they were appointed Assistant Engineers. These, however, were not the only points of interest in the reorganization scheme. An era of great activity and expansion was inaugurated. A Committee of Management was appointed, and the College was affiliated to the Allahabad University. The first revised entrance examination, applicable to both

English and Indian students, was held. A class was formed for Mechanical Apprentices, having a three-year practical course in the Workshops combined with theoretical education. An Industrial Class was started; this had also a three-year course, divided into 15 sections, including Press work, Photography, Photo.-Mechanical Processes, and Art Handicrafts. Students could take up one or more of these sections according to their capabilities. The affiliation to the Allahabad University, though nominally effected, was never actually completed, and in time it died a natural death as did the affiliation to Calcutta University in 1864. It is evident that the development of the College into a Technical Institute was started with the greatest vigour under the control of the Education Department. The Thomason College became an educational institution under that Department, and all important matters had to be referred to the Committee of Management, which became later the Advisory Council. In 1896, a clock was presented by H. E. Sir Bir Shumsher Jung, K.C.S.I., at a cost of Rs. 2500/- and placed on the College dome.

The next few years showed the progress of the College as a Technical Institute. The Technical and Scientific side was greatly strengthened, while the Civil Engineering side seems to have remained as before. In 1897 two Professors, two Instructors and a Demonstrator were appointed to the Staff, *viz.*, a Professor of Mathematics (Mr. Tipple), and of Experimental Science (Mr. Sedgwick), an Instructor in Applied Science, a Technical Instructor and a Laboratory Demonstrator. A Chemical Laboratory was started. New Technical Workshops were sanctioned. In 1899 an Electrical Engineer Class was started. In 1901 the new Technical Workshops, equipped with the latest machinery run by electricity, were built at a cost of Rs. 33,000. The Applied Science Laboratories were fully equipped. A Physical and Mechanical Laboratory was provided. The College Press was enlarged and remodelled, and an electrically operated water-supply system for the whole College was installed. Before the completion of all these alterations and additions, which were necessary to carry out the details of the reorganisation scheme of 1896, Colonel J. Clibborn, C.I.E., I.S.C., went on furlough pending retirement in 1901, and his duties as Principal were taken over by Capt. E. H. deV. Atkinson, R.E., (now Lt.-General Sir Edwin Atkinson, K.B.E., C.B., C.M.G., C.I.E.) who

remained as Principal from 1902 to 1915 when he left the College (as Lt.-Colonel Atkinson, C.I.E., R.E.) to proceed on active service during the Great War. A Council was created in 1901 to assist the Principal in regulating the courses of study and other matters which were recognised as outside the province of the Committee of Management. A sub-Committee of this Council, now called the *Board of Studies*, still performs these duties, though the Council itself has ceased to exist. The enlargement of the Thomason College between the years 1896 and 1900 may be judged by the facts that the number of classes increased from 8 to 25, the number of students from 185 to 824, the fees from Rs. 4,121 to Rs. 16,784, and yet the yearly cost of the entire management fell from Rs. 1,48,261 to Rs. 1,32,064. These facts were pointed out by Sir A. P. MacDonnell, Lieut.-Governor, in a speech delivered at Roorkee, on the 6th November, 1900, when he added that it was the object of Government to develop the Thomason College into a Technical Institute for the North-West Provinces and Oudh, which should control, stimulate, and inspire technical teaching of all kinds. Experience, however, showed later that advanced technical instruction was not easy at Roorkee, and could not be given there except at the expense of higher civil engineering instruction. The Thomason College, with its 25 classes, was becoming very complicated, though such expansion may have been expedient under the industrial and technical conditions then obtaining.

Captain Atkinson, R.E., in 1902, set about the reorganization of the interior economy of the College. Fortnightly examinations—a trial both to the staff and students—were abolished. The session was for the first time divided into three terms, and the examinations grouped together at the end of each term. A new time-table was introduced and the allotment of marks re-arranged. The length of each attendance, which had so far been invariably 3 hours, was changed to  $1\frac{1}{2}$  hours, except for certain subjects such as Laboratory work and Drawing. The arrangement of the staff was altered. Each branch of study was placed under a Professor, with assistants who were responsible for the teaching of that branch throughout the College. A Dairy was started in connection with the College Stores which has been founded by the staff and students. In

July the College was visited by the Lieutenant-Governor, Sir Digges La Touche, and as a result of his inspection, a number of much-needed buildings were sanctioned. In the early part of 1903, most of these buildings were completed. They included a building for the Stores and Dairy, a bazar, a central power-house, improvements to the quarters, new latrines, the completion of the system of drainage, and a house for the Applied Science Instructor. A grant of Rs. 24,000 was sanctioned, to be spread over four years, for bringing the supply of Surveying instruments in the College up-to-date. In 1904 further improvements in interior economy were made. The syllabuses for all the classes were revised and brought up-to-date. The list of text-books in use was revised, and recent and more approved methods of instruction in Geometry and Mechanics introduced. A start was made to equip a Mechanical Laboratory for the practical teaching of Mechanics. Instead of specified text-books for the Entrance examination of the Civil Engineer Class, a brief Syllabus was prepared for each subject and published in the Circulars. A Survey Class for Indian Officers of the Imperial Service Troops was held for the first time. The Mechanical Apprentice Class, which was started in 1896, was placed on a more practical basis, an entrance examination introduced, and the course altered to three years at College and two years as Indentured Apprentices in outside workshops. The rules for the Draftsman and Computer Class were altered, and an examination in Drawing was held for men who had passed the Lower Subordinate Class Entrance examination but failed to obtain vacancies. An Instructor in Chemistry was appointed in 1904 (Dr. P. P. Phillips, who was soon afterwards graded as Professor). The College Press was reorganized, the Typographic branch being reduced and the Lithographic branch developed. The terms of admission to the Industrial Apprentice Class were altered, the payment of scholarships in special cases being substituted for stipends. The College had indeed entered upon an era of strenuous reorganization and expansion.

On the 8th April, 1905, H. E. the Viceroy, Lord Curzon, inspected the Thomason College, and on the 7th March, 1906, the College was greatly honoured by a brief visit from Her Royal Highness the Princess

of Wales (now Her Majesty Queen Mary), who afterwards presented portraits of H.R.H. the Prince of Wales and herself to the College. The Lieutenant-Governor—Sir J. J. D. La Touche,—visited the College during 1905. A Professor of Surveying and Drawing, and a Demonstrator in Chemistry, were added to the staff in 1905, and Mr A. M. McLean joined the staff as an Instructor in Mechanical Engineering in 1906. In the year 1907, a large scheme for the further development of the College as a Technical Institute was sanctioned. The Lieutenant-Governor at that time—Sir John Hewett—was greatly interested in industrial and technical education. An electric light, fan, and telephone system was installed in the College main building, the Workshops, and the Principal's residence. New engines of ample power were laid down. A Technical Class was started, and the Mechanical Apprentice Class enlarged. To meet these increases, additional hostel accommodation was built, the workshops doubled in size, new class rooms built, additional staff entertained, a new water-supply inaugurated, and last, but not least, new laboratories for the College sanctioned at a cost of Rs. 94,000. In the following year (1908), the buildings sanctioned in the expansion scheme were practically finished and the new engines and water-works installed. An Automobile Driver Class was started and good progress was made at first in training drivers. The Calcot Reilly Memorial Fund from the late Cooper's Hill College was handed over to the College to be given for Applied Mechanics in the Civil Engineer Class. Mr. C. J. Veale joined the College Staff in 1908 as Professor of Surveying and Drawing. The new accommodation for the Photo-Mechanical Department (the College Press) was completed in 1909, and in this year the late expansion of the Professorial staff necessitated a scheme to provide new and better staff bungalows. A site in the vicinity of Malikpur Village was acquired, and the village removed to Khanjarpur. In October, 1909, His Honour the Lieutenant-Governor, Sir John Hewett, visited the College and opened the new laboratories, additions to workshops, and the electrical and power installations and a new double storeyed hostel. A sub-committee of the College Council was formed into a *Board of Studies* to advise on all matters connected with courses, examinations, and time-tables. In 1910 the Technical Class was abolished and arrangements made to form a department of Techno-

logy. Major H. B. D. Campbell, R.E., (Assistant Military Principal) left the College in which he had served since 1897, and was re-placed by Captain E. W. C. Sandes, R.E., who joined as Professor of Civil Engineering on the abolition of the post of Assistant Military Principal. Mr. H. P. Jordan also joined as Professor of Mechanical Engineering. An elaborate educational plant of Cotton Machinery was installed in the College Workshops, with an expert instructor in charge of the Cotton Class. Five houses were built in 1910 and 1911 for College professors on the Malikpur estate, though not taken into use till late in 1912. A Department of Technology was formed on revised lines to consist of (1) a Higher Division, (2) a Lower Division (Mechanical Apprentice Class), (3) an Automobile Driver Class. Marks, throughout the College, were re-arranged, and few papers were valued at less than 100 marks. Special grants were assigned for Survey equipment and Workshops equipment.

A large Textile Department building was built in the Workshops enclosure in 1911 and 1912: all the cotton machinery was erected in it. This is the building—now outside the Workshops enclosure—which was converted later for use by the Overseer Class and staff as classrooms and offices, and known as the Overseer Class Annexe. The Automobile Driver Class was transferred to Lucknow. This transfer marked the beginning of the gradual diminution of all Technical and Industrial classes in the Thomason College and its reversion from a Technical Institute into a purely Civil Engineering institution as it is to-day. In 1913 nine Anglo-Indian students joined the Textile (Cotton Spinning and Weaving) Class, but the Class did not seem to be a success. After a few years admissions to it ceased at Roorkee, and later the Cotton Machinery was transferred elsewhere. In 1914 admissions to the higher division of the Department of Technology at Roorkee ceased, and the lower division (the Mechanical Apprentice Class) was transferred to Lucknow, so that both these classes soon ceased to exist in the College. These changes marked a further step in the reversion of the College to a Civil Engineering institution, though, in 1914, a Mechanical and Electrical Engineer Class was started and was maintained for a time. In 1913 the Public Services Commission, under Lord Islington, visited the College. There were no other events of much importance in the



College in the years 1913 and 1914. The institution developed gradually in different ways, but in a calm and peaceful atmosphere rudely broken in August, 1914, by the world-wide catastrophe of the declaration of War.

When the Great War commenced, the College was in vacation, but in October, 1914, when it re-opened, great enthusiasm and patriotism were shown by the staff and students who subscribed Rs. 2,500/- towards the Imperial Relief Fund and followed daily the progress of the war on maps hung in the College corridor. Mr. B. M. Mukerjee, Professor of Physics, volunteered in 1914 for service in the X-ray section of the General Hospital and left for active service in the Western theatre, not returning until 1920. Captain E. W. C. Sandes, R.E., proceeded on active service to Mesopotamia in March, 1915, where he was captured with the 6th Indian Division at Kut-el-Amarah in April, 1916, after a siege lasting five months, and was a prisoner-of-war in Turkey thereafter till the end of the war in 1918. The Principal, Lt.-Colonel E. H. de V. Atkinson, C.I.E., R.E., proceeded to England in July, 1915, where he was appointed C.R.E. of a Division and rose to be Chief Engineer of the 4th Army on the Western front before the end of the war with the rank of Major-General and many decorations. Mr. E. F. Tipple officiated as Principal till October, 1916, in his absence. Mr. H. P. Jordan, Professor of Mechanical Engineering, and Mr. A. M. McLean, Instructor in the same Department, obtained commissions in the Indian Army Reserve of Officers and left on military service in May, 1915 and August, 1915, respectively, Mr. Jordan returning, invalided, in October, 1915, and Mr. (then Major) McLean, M. C., in 1920 after service in Mesopotamia and staff employment in India. Mr. E. S. Griffith, an Instructor, obtained an I.A.R.O. commission in May, 1917, and Mr. G. Lacey, who joined the College as Professor of Civil Engineering in November, 1915, also obtained a commission in 1917, and both left the College. Many European students, who were passing out of the College, received commissions, and the names of those students killed in the War appear on a brass memorial tablet in the College. It is evident that the War took a heavy toll of the College Staff, and instruction became increasingly difficult. Funds

were also scarce, so that any large expansions had to be postponed till better times. Nevertheless the instructional work continued. The Public Works Department assisted the College by recommending the appointment as Principal of Mr. W. Gunnell Wood, C.S.I., late Chief Engineer, Buildings and Roads Branch, United Provinces, and this appointment was made in October, 1916. Sir James Meston, Lieut.-Governor, visited the College in February, 1916.

The Public Works Reorganization Committee visited the Thomason College in 1917, and in July of that year His Honor the Lieut.-Governor of the United Provinces, Sir James Meston, presided at the annual Convocation. The Indian Defence Force came into existence, replacing the Mussoorie Volunteer Rifles, and all British subjects in the College were enrolled in the new formation. Admissions to the Textile Class ceased in 1918, but the class was not transferred finally to Cawnpore till January, 1920. The declaration of the Armistice was duly celebrated in November, 1918, and the College settled down to consolidate its position in the difficult times which succeeded the War when political unrest in certain districts, and lack of funds for new schemes, rendered the task of Government no easy one. Mr. E. F. Tipple, Professor of Mathematics, vacated his post in April, 1919, after 22 years' service at the College during which he twice officiated as Principal. In February, 1920, Major E. W. C. Sandes, D.S.O., M.C., R.E., re-joined the College Staff, from leave after the War, as a Professor of Civil Engineering, and subsequently officiated as Principal for several months during the absence on leave of Mr. W. G. Wood, C.S.I. During 1920 and 1921, the College suffered heavily through the deaths of Mr. F. W. Sedgwick, Professor of Electrical Engineering and Physics, who had served on the College Staff for 23 years, and Sub-Conductor G. E. Lansley, Personal Assistant to the Principal, on 22nd March, 1920, and 6th October, 1921, respectively. Mr. W. L. Stampe, I.S.E., was appointed as a second Professor of Civil Engineering in November, 1920, and Mr. J. M. Salusbury Trelawny as a third Professor in October, 1921. There were many changes in the superior staff at this time, due to the altered conditions after the close of the War and the retirement of officers who had carried on the work ably during the War.

It is not proposed, in this history, to deal with changes of staff other than Professorial staff, except in unique cases, and, as regards Professors, merely to mention the times of their first appointments and dates on which they vacated their posts finally. Officiating appointments, and those owing to leave vacancies, are too numerous and would make the history unwidely. Reference to the Annual Report at the end of the Calendar of any year will show in detail the changes in the staff during that year. For easy reference a List of Principals follows this History in the Calendar, and also a list of Convocation Presidents, *i.e.*, officers who presided at the Annual Convocations and Prize-givings. A further list of very distinguished Visitors is added. Many other senior officials have also visited, and continue to visit, the College; the Annual Report of each year shows their names, and, needless to say, the College welcomes such indications of their interest in it.

A complete Reorganization Scheme for the Staff of the Thomason College, dated the 12th July, 1919, was drawn up in that year by the Committee of Management of the College to suit the new requirements of Government under the Reforms Scheme and the new policy laid down for the future of the College, and it was duly submitted to the Secretary of State. The scheme was necessitated by the proposal to close down certain classes in the College as mentioned hereafter. The Committee of Management proposed certain modifications of the original scheme in May, 1920, and final sanction to the amended scheme was accorded by the Secretary of State on 29th January, 1922. After 1920, admissions to the Upper Subordinate, Lower Subordinate, Industrial Apprentice, and Mechanical and Electrical Engineer Classes ceased. It had been decided finally that the training of Mechanical and Electrical specialist students, and Industrial and Technical students, was not suited to Roorkee, and this decision marked the end of the scheme to develop the Thomason College as a Technical Institute. The cessation of recruitment to the Upper and Lower Subordinate Classes, and the consequent disappearance of the last students of these classes in July, 1922, was brought about by changes in the organization of the Public Works Department under which many sub-divisions were to be in the charge of Assistant Engineers (Provincial Service) instead of Upper Subordinates. This scheme made it advisable to train sub-overseers to a standard higher than the Lower Subordinate Class a

recruits for the new Subordinate Engineering Service. Hence, when the Upper Subordinate and Lower Subordinate Classes were to be abolished in the College, a scheme was prepared to replace them by a new Overseer Class of intermediate standard. The new Overseer Class was approved, and the first students were admitted in October, 1922, for a 3 years' course, 40 vacancies being offered annually for competition. This 3 years' course was later reduced to 2 years. The former Lower Subordinate Class Staff was transferred to the Overseer Class, but later the instruction was supervised and assisted also by the Lecturers of the Civil Engineer Class. It was originally intended that the Overseer Class should be located at Roorkee only until buildings were ready at Lucknow to accommodate it. The last students of the Mechanical and Electrical Engineer Class and the Industrial Apprentice Class passed out of the College in July, 1923, but a class for Draftsmen was retained and still exists. A batch of 20 Military students was admitted to the College in January, 1922, as a special case, to meet the requirements of the Military Engineer Services (old M. W. S.) for a short course of training approximating to that of the abolished Upper Subordinate Class with due regard to the shorter duration. This batch left the College in July, 1923. A second batch of ten Military students only was admitted in October, 1922, and passed out in July, 1924, and with that batch the class ceased to exist in the Thomason College, and all Collège students have since then been civilians.

In the year 1921, the College Committee of Management was replaced by an *Advisory Council*, constituted under G.O. No. 1573/XV-312, dated the 10th July, 1920. The last meeting of the Committee of Management (45th) was held on the 9th July, 1920, and the first meeting of the Advisory Council on the 17th February, 1921. The Council was formed with 10 members as compared with 7 members constituting the Committee, but the number of members in the Council has since increased. The status of the Thomason College was improved owing to the Government of India offering to the Civil Engineer Class 10 or 9 vacancies in alternate years, in the Indian Service of Engineers, as *guaranteed appointments*. This step, by which employment in the Imperial Service was again thrown open to highly qualified students, was a return to the practice in vogue up to 1894 when students

could pass into that Service. The constitution of the Indian Defence Force was changed in 1921 to the Auxiliary Force (India), and the College detachment (Europeans) became a part of the Mussoorie Battalion, being organized as a Machine Gun Section. As increased accommodation for Professors was required, one thatched bungalow almost opposite the Royal Engineers Mess was replaced by a pukka building in 1920, and in 1921 the construction of a pukka bungalow was commenced opposite the Royal Engineers Mess and another further east. In October, 1921, Mr. W. G. Wood, C.S.I. vacated the post of Principal and was succeeded by Major E. W. C. Sandes, D.S.O., M.C., R.E.

His Excellency the Governor of the United Provinces, Sir Harcourt Butler, K.C.S.I., C.I.E., presided at the College Convocation and Prize-giving in July, 1922. In this year a Committee was appointed by Government to inspect the College Press with a view to possible economies through the transfer of the control of the Press to the Superintendent of the Government Press, Allahabad (then Mr. Abel). Though the Committee recommended the transfer, the Advisory Council was averse to it, and Government accepted the opinion of the Council. The two new bungalows for Professors were completed in 1922, and funds were given for the transfer of the Textile (Cotton) Machinery to Cawnpore and the conversion of the Textile Building into an Annexe for the Overseer Class instruction. The benefits of the sanctioned Reorganization Scheme were felt in this year. All members of the instructional Staff were allowed rent-free quarters from October 1922, and salaries were improved. Mr. H. P. Jordan, Professor of Mechanical Engineering, then on leave, was transferred to the Poona Engineering College in October, 1922. Mr. Dhawan, Mr. Raja Ram, Mr. B. D. Puri, and Mr. Shiv Narayan, joined the Staff as Professors of Civil Engineering (Railways), Civil Engineering (Sanitary), Mathematics, and Electrical Engineering and Physics respectively; also Mr. Chuckerbutty as Assistant Professor of Surveying and Drawing. But Mr. Shiv Narayan and Mr. Chuckerbutty were transferred elsewhere after one Session and the posts remained vacant, and Mr. Dhawan also left in October, 1923.

His Excellency Sir William Marris, K.C.S.I., K.C.I.E., who succeeded Sir Harcourt Butler as Governor, presided at the Convoca-

tion in July 1928. This occasion was unique in that the Governor of the Punjab, His Excellency Sir Edward Maclagan, K.C.S.I., C.I.E., was also present, and distributed the prizes at the request of Sir William Marris. Sir Edward Maclagan had been invited in view of his connection with the College through his father, Colonel R. Maclagan, R.E., who was the first Principal. A portrait of Colonel Maclagan, presented by His Excellency Sir Edward Maclagan in commemoration of his visit, hangs in the Convocation Hall. Mr. C. J. Veale, Professor of Surveying and Drawing, officiated as Principal for a period of six months in 1923, (including the College vacation) in the absence of Major Sandes and Dr. P. P. Phillips. In November, 1923, sanction was given to the formation of one Platoon of the 3rd (Allahabad) Battalion of the University Training Corps (Indian Territorial Force) at Roorkee, thus enabling the Indian students to undergo military training for the first time. Applications for enrolment far exceeded the vacancies, and there was great keenness. Unfortunately the strength of one Platoon did not allow of the actual enrolment of more than one half of the Civil Engineer Class students, but the remainder received military drill instruction. The Overseer Class students continued to receive instruction in physical drill.

Major-General Sir Edwin Atkinson, K.B.E., C.B., C.M.G., C.I.E., Master General of Supply and a former Principal of the College, presided at the Convocation in July, 1924. During this year the grant for repairs was increased and much necessary and overdue work was carried out, including re-roofing the College bazaar buildings, and the completion of new out-buildings and the re-roofing of servants quarters. Dr. P. P. Phillips, on return from leave, officiated as Principal from October, 1923, till the return from leave of Major E. W. C. Sandes, in October, 1924. A Special Committee was assembled by Government at Roorkee in December, 1924, to investigate certain matters connected with the syllabuses, courses of study, and staff, of the Thomason College, arising out of the introduction of the Reorganization Scheme of 1919. A very comprehensive report was submitted by this committee in 1925 which was subsequently dealt with, item by item, by the Advisory Council whose recommendations caused Government to sanction several useful alterations and innovations in the College courses. Mr. A. C. Verrières, C.I.E., Chief Engineer,

Buildings and Roads Branch, Public Works Department, United Provinces, an old student of the College, presided at the Convocation in July, 1925. this being the first instance of a past student performing this duty. An extension of the Indian Engineer Class Club was put in hand, and also several internal alterations in the College itself and in hostels, and re-roofing of certain bungalows with jack-arches. A very fine steel model of a Plate-Girder bridge span, on a large scale, was presented to the College by Messrs. Burn and Co., Howrah, and installed in one of the College model rooms which have been developed into useful instructional departments. Mr. R. A. Bradshaw-Smith, I.S.E., joined the Staff as Professor of Civil Engineering (Irrigation) in February, 1925, Mr. L. E. Dawson having acted temporarily since Mr. W. L. Stampe vacated the post in October, 1924.

The President at the College Convocation in July, 1926, was His Excellency Sir Malcolm Hailey, K.C.S.I., C.I.E., Governor of the Punjab. He was invited to preside because the Punjab had, of late years, been so largely represented in the College. Indeed, the Punjab candidates for the Civil Engineer Class had become as numerous as those from the United Provinces, the Punjab paying the expenses of the training of every such candidate who gained admission, though admissions were limited. The Board of Studies, in 1926, formulated proposals for the improvement of the Overseer Class course and instruction. A grant was given by Government for the purchase of additional plant for the College Workshops which lacked modern generating machinery. Two vestibules, one class room and three offices were re-roofed in the main College building, and also certain servants quarters and small outhouses. Another Lecturer's bungalow was re-roofed with jack-arches.

The Convocation President in July, 1927, was Mr. B. D'O. Darley, C.I.E., I.S.E., Chief Engineer, Sarda Canal, and Secretary to Government, United Provinces. Public Works Department, Irrigation Branch. Mr. Salig Ram, I.S.E., an old student, joined the Staff in June, 1927, as Professor of Civil Engineering. The College was grieved to learn of the death of a distinguished past student, Sir Ganga Ram. During the summer a new flag-staff was erected in front of the College.

This brief history having now been written up to the end of the

College Session of 1926-27,—a period of 80 years since the foundation of the Thomason College in 1847—it may be well to continue it year by year in the form of a *Sessional Diary* including the *preceding* vacation, *i.e.*, by yearly periods from the 15th July to the 15th July, and this system will henceforth be adopted. It should be realised that all facts and events cannot be recorded in the History, but only those of importance.

*Session 1927-28.*—A great event in the Session 1927-1928 was the visit of His Excellency the Viceroy, Baron Irwin of Kirby Underdale, G.M.S.I., G.M.I.E., to the Thomason College on the 11th April, 1928. His Excellency and Staff detrained in the early morning, motored round the College estate, and then visited the Workshops and inspected the College, and later inspected also the College Press before departing by motor for Dehra Dun. His Excellency inspected a Guard of Honour of the College students, and was photographed with the staff, students, and visitors. He expressed himself as much gratified with all he saw, and presented a photograph to the Principal, an enlargement of which appears in the College entrance. The honour of this visit was greatly appreciated by the College as a whole, and particularly since no Viceroy had visited the institution since Lord Curzon came in 1905. His Excellency the Viceroy was pleased to enter the following remarks in the College Visitors' Book :—

“It gave me great pleasure to visit the Thomason College today and to see with my own eyes the institution which has turned out so many famous engineers. The equipment was obviously of a high standard, and the curriculum appeared to me very comprehensive and wisely drawn for its purpose. I was greatly impressed by all I saw, and by the many evidences of the way in which Colonel Sandes and his Staff are carrying on the work. I am very grateful to him for giving me so interesting and instructive a morning, and to him, as to the College and its students, I can wish nothing better than that the College may maintain the high standard and tradition which is associated with its name.

IRWIN.”

The Principal, Lt.-Col. E. W. C. Sandes, D.S.O., M.C., R.E., was placed on deputation for one month in November, 1927, with



the Rangoon University to advise about the Engineering College at Rangoon, and he proceeded to Burma for this purpose. The Civil Engineer Class students passing out of the Thomason College in July, 1928, were the first batch for many years to whom the Government of India guaranteed no appointments in the Indian Service of Engineers, such guarantee having been withdrawn in the case of students entering in October, 1925, and thereafter. The entrance examination to the Civil Engineer Class in June, 1928, was also the first examination conducted under a revised syllabus of a higher standard than formerly, with the approval of Government and the Advisory Council, and stipulating also a higher qualifying standard than before for permission to sit for that examination, viz., the Intermediate, or equivalent standard, in place of the Matriculation or equivalent. It was anticipated that this raising of standards would cause a marked decrease in the number of candidates, but such is the reputation of the Thomason College, and the prospects offered to students, that this was not the case. Indeed 203 candidates, who were qualified under the new rules, entered for the examination in June, 1928, in competition for the usual 30 ordinary annual vacancies in the Civil Engineer Class. In the Overseer Class 236 candidates entered for 40 vacancies. During the summer of 1928 most of the College Staff benefited by the recent completion by the Public Works Department of temporary lines on the College estate for the supply of electric current from Bahadarabad. Consumers made their own arrangements for temporary internal wiring and fittings, pending permanent arrangements, but were able to draw current, on payment, from the Public Works Department through the sub-station erected in 1927 on the College estate. The students' Mess and Club similarly benefited. The first P. W. D. Power Installation at Bahadarabad was completed in 1913 and was arranged to supply alternating current to the Canal Headworks at Bhimgoda only, the alternators being driven by turbines operated by canal water. In 1924-26, however, the power station was greatly enlarged, alternative plant was installed, and the electric supply given to Hardwar and adjacent places. A line was laid also to supply the whole of Roorkee, including the College, part of whose electric current now comes indirectly from its parent, the River Ganges. The new water-supply system for the

College estate, however, could not be installed as funds were not available. A very large steel model road bridge of Baltimore Truss type, with overhead bracing, was received during 1927 from Messrs. Burn and Co., Howrah, and placed in the Bridges model room during the Session 1927-28, complete with framed diagrams and calculations. Most of the cost was generously met by the firm. The liquidation of the College Stores was completed, and Messrs. Murray and Co., Lucknow, started a branch establishment on the College estate. The staff and students of the College learnt with the deepest regret on the 17th June, 1928, that His Excellency the Governor of the United Provinces, Sir Alexander Muddiman, Kt., K.C.S.I., C.I.E., had died on that day. His Excellency had undertaken to preside at the Annual Convocation in July, 1928. In consequence of this tragic event, Mr. A. H. Mackenzie, C.I.E., Director of Public Instruction, United Provinces, presided at the Convocation and distributed the prizes and certificates. This function brought to a close a notable Session—the first since 1905 in which the College had been honoured by a visit from a Viceroy. A silver challenge cup, to be awarded annually to the best student in Games and Sports, was donated to the College by the Principal, Liett.-Colonel E. W. C. Sandes, and was presented to the first winner at the Convocation, together with a miniature cup. Another silver challenge cup was donated by Mr. B. D. Puri, Professor of Mathematics, for Squash Racquets Doubles, and a third cup by Mr. J. Barnett, Personal Assistant to the Principal, for the Overseer Class in the Athletic Sports. These cups were also presented at the Convocation. A fourth silver cup, for an annual cross country race, was promised by Mr. R. A. Bradshaw-Smith, Professor of Civil Engineering, on leaving the College when reverting to his Department in 1928.

*Session 1928-29.*—The Hon'ble Raja Bahadur, Khushalpal Singh the United Provinces Minister for Education presided at the annual Convocation in July 1929. Dr. P. P. Phillips officiated as Principal from May 1929 until the end of the session in place of Colonel Sandes who was granted leave. During the year funds were provided by Government for the installation of electric light in all the College residential quarters, a benefit which was appreciated by all concerned.

The separate department of Electrical Engineering and Physics was abolished and the instruction in Electric Engineering transferred to the Mechanical and Electrical section at the Workshops. The Physics was combined with the work of the Chemistry Department, which henceforth will be known as the Department of Applied Science. Lt. J. S. Gurney took charge of the post of Head Master, Overseer Class from the beginning of the session.

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## LIST OF PRINCIPALS.

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Colonel R. Maclagan, R.E.,	...	... 1847—1860
Captain E. C. S. Williams, R.E.,	...	... 1860—1862
Colonel J. G. Medley, R.E.,	...	... 1863—1871
Colonel A. M. Lang, R.E.,	...	... 1871—1877
Colonel A. M. Brandreth, R.E.,	...	... 1877—1891
Colonel F. D. M. Brown, V.C., I.S.C.,		... 1891—1892
Lt.-Colonel J. Clibborn, C.I.E., I.S.C.,		... 1892—1902
Lt.-Colonel E. H. de V. Atkinson, C.I.E., R.E.,	...	... 1902—1915
Mr. W. G. Wood, C.S.I.,	...	... 1916—1921
Lt.-Colonel E. W. C. Sandes, D.S.O., M.C., R.E.,		1921— <i>In Office</i>

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*Note.*—The ranks shown are those held on vacating the appointment. Officiating Principals are omitted from the list, but many names appear in the Calendar of 1911, and the names of Mr. E. F. Tipple, Major E. W. C. Sandes, D.S.O., M.C., R.E., Dr. P. P. Phillips, and Mr. C. J. Veale should be added for recent years.

**LIST OF CONVOCATION PRESIDENTS.**

FROM 1890.

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1890. The Hon'ble Sir Auckland Colvin, K.C.M.G., C.I.E., Lieut.-Governor, N.-W.P.
1891. Mr. T. H. Wickes, Chief Engineer, P.W.D., N.-W.P.
1892. The Hon'ble Sir Auckland Colvin, K.C.M.G., C.I.E., Lieut.-Governor, N.-W.P.
1893. Mr. A. H. Harington, I.C.S., Commissioner, Meerut Division.
1894. Mr. J. G. H. Glass, C.I.E., Chief Engineer, P.W.D., N.-W.P.
1895. }  
to } Principal, Thomason College, (Lt.-Col. J. Clibborn, I.S.C.).  
1897. }
1898. Offg. Principal, Thomason College, (Lt. H. B. D. Campbell, R.E.).
1899. }  
to } Principal, Thomason College, (Lt.-Col. J. Clibborn, I.S.C.).  
1901. }
1902. His Honor Sir J. J. D. La Touche, K.C.S.I., Lieut.-Governor, U.P.
1903. Principal, Thomason College, (Major E. H. deV. Atkinson, R.E.).
1904. Lt.-Colonel A. E. Sandbach, R.E., 1st Sappers and Miners, Roorkee.
1905. Lt.-Colonel S. V. Thorton, R.A., O. C. Station, Roorkee.
1906. }  
to } Principal, Thomason College, (Major E. H. deV. Atkinson, R.E.).  
1909. }
1910. Mr. C. E. V. Goument, Chief Engineer, P.W.D., U.P.

1911. }  
to } Principal, Thomason College, (Lieut.-Colonel E. H. deV.  
1915. } Atkinson, C.I.E., R.E.).
1916. Mr. W. Gunnell Wood, C.S.I., Chief Engineer, P.W.D., U.P.
1917. His Honor Sir James Meston, K.C.S.I., Lient -Governor, U.P.
1918. Mr. F. C. Rose, M.I.C.E., Secretary to Government of India,  
P.W.D.
1919. Mr. T. R. J. Ward, C.I.E., M.V.O., I.G. of Irrigation in  
India.
1920. Colonel Sir S. D'A. Crookshank, K.C.M.G., C.B., C.I.E.,  
D.S.O., M.V.O., Secretary to Govt. of India, P.W.D.
1921. Mr. E. St. J. Gebbie, C.I.E., I.G. of Irrigation in India.
1922. H. E. Sir Harcourt Butler, K.C.S.I., C.I.E., Governor, U.P.
1923. H. E. Sir William Marris, K.C.S.I., K.C.I.E., Governor, U.P.
1924. Major-General Sir E. H. deV. Atkinson, K.B.E., C.B., C.M.G.,  
C.I.E., Master General of Supply.
1925. Mr. A. C. Verrières, C.I.E., Chief Engineer, P.W.D., U.P.
1926. H. E. Sir Malcolm Hailey, K.C.S.I., C.I.E., Governor,  
Punjab.
1927. Mr. B. D'O. Darley, C.I.E., Chief Engineer, Sarda Canal,  
U.P.
1928. Mr. A. H. Mackenzie, C.I.E., Director of Public Instruction,  
United Provinces.
1929. The Hon'ble Raja Bahadur Kushalpal Singh, M.A., LL.B.,  
Minister of Education, U.P.
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FROM 1890.

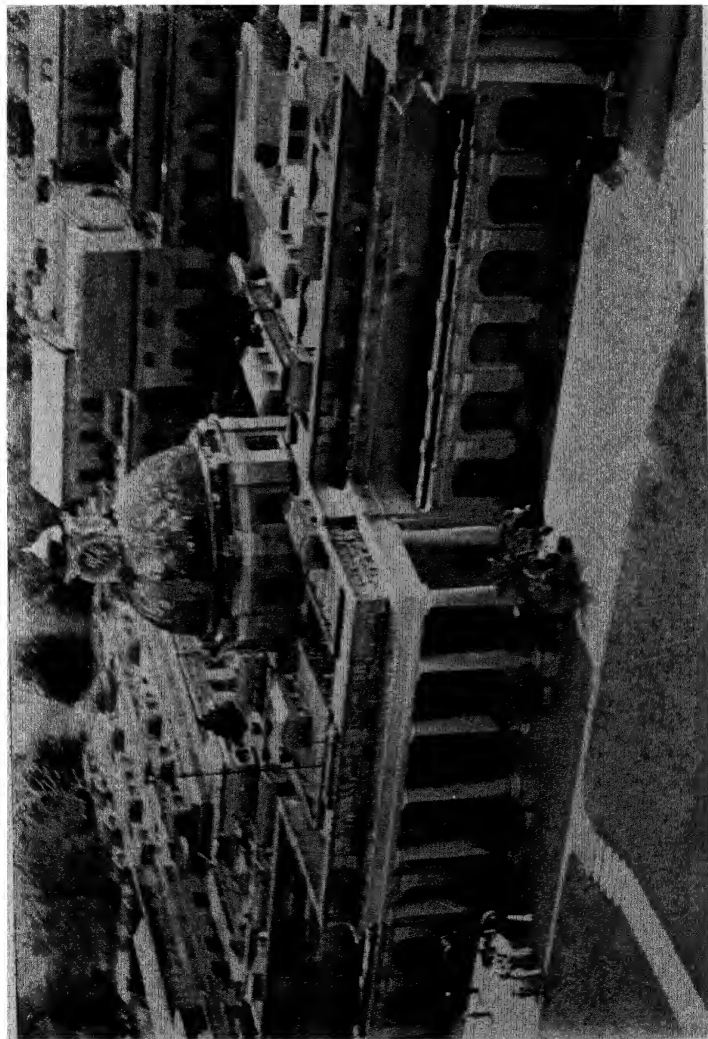
*(Of ranks included in Articles 1 to 30 only of the Warrant of  
Precedence, 1922 ).*

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1890. The Hon'ble Sir Auckland Colvin, K.C.M.G., C.I.E., Lieut.-Governor, N.-W.P.
1892. The Hon'ble Sir Auckland Colvin, K.C.M.G., C.I.E., Lieut.-Governor, N.-W.P.
1895. His Honor Sir A. P. MacDonnell, K.C.S.I., Lieut.-Governor, N.-W.P.  
Lieut.-General Sir W. K. Elles, K.C.B., Commanding the Forces in Bengal.
1900. His Honor Sir A. P. MacDonnell, K.C.S.I., Lieut.-Governor, N.-W.P.
1901. The Bishop of Lucknow.
1902. His Honor Sir J. J. D. La Touche, K.C.S.I., Lieut.-Governor, U.P.  
Major-General W. T. Shone, C.B., D.S.O., D.G.M.W.  
Major-General Beresford Lovett, C.B., D.G.M.W.
1903. Sir A. T. Arundel, K.C.S.I., I.C.S., Member of the Viceroy's Council.
1905. H. E. Lord Curzon of Kedleston, P.C., G.M.S.I., G.M.I.E., Viceroy and Governor-General of India, (8th April).  
His Honor Sir J. J. D. La Touche, K.C.S.I., Lieut.-Governor, U.P.
1906. Her Royal Highness the Princess of Wales (7th March).
1913. Lord Islington, P.C., G.C.M.G., D.S.O., Chairman, Royal Commission on the Public Services in India.
1916. His Honor Sir James Meston, K.C.S.I., Lieut.-Governor, U.P.
1917. His Honor Sir James Meston, K.C.S.I., Lieut.-Governor, U.P.  
General Sir Charles Munro, G.C.B., G.C.M.G., G.C.S.I., Commander-in-Chief in India.  
Lieut.-General Sir George Kirkpatrick, K.C.B., K.C.S.I., Chief of Staff in India.

1918. Lieut.-General Sir H. D. Keary, K.C.B., D.S.O., G.O.C., Meerut Division.
1919. Mr. T. R. J. Ward, C.I.E., M.V.O., Inspector-General of Irrigation in India.  
General Sir Charles Munro, G.C.B., G.C.M.G., G.C.S.I., Commander-in-Chief in India.
1920. Lieut.-General Sir Havelock Hudson, K.C.B., C.I.E., G.O.C.-in-C., Eastern Command.
1921. General Sir Claude Jacob, K.C.B., K.C.M.G., Chief of the General Staff in India.  
Major-General Sir Edwin Atkinson, K.B.E., C.B., C.M.G., C.I.E., Master General of Supply, India.  
Mr. E. St. J. Gebbie, C.I.E., Inspector-General of Irrigation, India.  
Mr. B. N. Sarma, Revenue and Public Works Member, Government of India.
1922. H. E. Sir Harcourt Butler, K.C.S.I., C.I.E., Governor, U.P.  
Field Marshall Sir William Robertson, G.C.B., G.C.M.G., K.C.V.O., D.S.O.  
The Hon'ble Mr. C. Y. Chintamani, Minister of Education and Industries, U.P.
1923. H. E. Sir William Marris, K.C.S.I., K.C.I.E., Governor, U.P.  
H. E. Sir Edward MacLagan, K.C.S.I., K.C.I.E., Governor, Punjab.  
Major-General Sir Edwin Atkinson, K.B.E., C.B., C.M.G., C.I.E., Master General of Supply, India.  
The Hon'ble Raja Parmanand, Minister of Education, U.P.
1925. The Hon'ble Rai Rajeshwar Bali, O.B.E., Minister of Education, U.P.  
Major-General R. N. Harvey, C.B., C.M.G., D.S.O., Engineer-in-Chief, Army Head Quarters, India.
1926. H. E. Sir Malcolm Hailey, K.C.S.I., C.I.E., Governor, Punjab.  
The Hon'ble Sardar Jogendra Singh, Minister of Agriculture, Punjab.
1928. H. E. Baron Irwin of Kirby Underdale, G.M.S.I., G.M.I.E., Viceroy and Governor-General of India, (11th April).







COLLEGE MAIN ENTRANCE (AERIAL PHOTO).



*The rules in this Circular are liable to revision without notice in view of possible changes in the Course of Study, orders of Government, etc.*

## [ C I R C U L A R . ]

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### THOMASON CIVIL ENGINEERING COLLEGE, ROORKEE.

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1929.

*These rules apply to admissions in 1930.*

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### CIVIL ENGINEER CLASS.

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*(British and Indian candidates.)*

1. Candidates for admission to this class through the entrance examination must be Indians as defined below.\* Candidates whose parents or guardians are domiciled in Bengal, Madras, and Bombay Presidencies are, however, not eligible for admission without the previous sanction of the Local Government. Candidates must not be under 17 or above 21 years of age on the 1st June immediately preceding the entrance examination of this College in which they wish to appear.

Only such private students from Provinces or States outside the United Provinces, will be admitted to the Civil Engineer Class of the College who apply through the Government of the Province or State in which they reside for permission to appear in the admission examination of the College, and provided that the Government or State concerned agrees, in the event of such students gaining a place in the examination

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\* A "Native of India" means any person domiciled in British India or within the territories of Indian Princes tributary to, or in alliance with, His Majesty and born of parents habitually resident in India and not established there for temporary purposes only."

*Note.*—To constitute residence in a particular province or state the parent or guardian of a candidate for admission to the Thomason College, Roorkee, must have definitely settled and resided there for a period of three years.

*Note.*—This Circular is supplied only on pre-payment of  $\frac{1}{4}$  anna postage, to be enclosed with each application.

which would otherwise entitle them to admission, to pay a contribution towards the cost of their training, based on the actuals of the preceding financial year. The only exceptions to this rule will be where the United Provinces Government agree in special cases to waive this contribution, or the students themselves agree to pay it.

The age of a candidate will be taken from the original University records and for candidates who have not appeared for a University examination from College, or failing a College, from school records. No alterations in the records will be recognized except in the case of purely clerical errors. Application for examination must be accompanied by a true copy of University, College or school registers, as the case may be, signed by the Registrar, Principal or Head Master and under no circumstances will any alteration be accepted to the advantage of the candidate.

All Europeans before admission to this College must be properly protected by inoculation against enteric fever to the satisfaction of the Medical Officer in charge of the College. If not protected, they must be inoculated on arrival at the College.

2. No European or Anglo-Indian will be allowed to enter the College if married, or to continue in the College if he marries before completing his course.

3. The College session commences on 16th October. Applications for admission should *reach* the Principal, *complete in all respects, not later* than the 15th April nor before the 1st February preceding. The entrance examination will be held in the first week of June. The application should be accompanied by a statement of—

Date of birth of the candidate.

The school or schools at which he has been educated.

The profession, situation, relationship, and residence of his father or guardian.

One of the examination centres where he wishes to be examined (*vide* paragraph 9).

**N.B.—No notice will be taken of applications which are not complete in every respect nor will any correspondence be entered into concerning them.**

4. Every candidate will be required to produce testimonials\* (which will not be returned) of good moral conduct, under the hand of the instructor under whom he has been educated, or of some other superior under whom he may have been employed or brought up and these

testimonials should have reference especially to his conduct during the two years immediately preceding his application for admission.

5. A medical certificate must be furnished in the form printed after rule 29 ; no other form will be accepted.

6. An examination fee of Rs. 20 must be forwarded with the candidate's application : until this fee has been received by the Principal, the candidate's application will not be registered. In no circumstances will this fee be refunded to the candidate.

7. The minimum qualifying test for admission to the Entrance Examination, in the case of candidates from non-European institutions, is the Intermediate Examination of the Board of High School and Intermediate Education, United Provinces, or the Intermediate Examination of any University in British India established by law, or, in the case of candidates from European Schools, the Cambridge School Certificate with "credit" in additional Mathematics and a pass in either Chemistry or Physics, or the London University Matriculation Certificate which covers the subjects required for the entrance examination, or such other qualifications as may be accepted by Government as equivalent thereto.

8. The Entrance Examination is competitive, and those who stand highest on the list of passed candidates (only to the number of available vacancies, which is for the present fixed at 30) will be selected for admission to the College. The Local Government has power to relax in very special cases the rule regarding the number of admissions. Any candidate who, after being duly notified, fails to join the College on the day fixed for the reopening of the session, or, who, before that date, fails to obtain from the College authorities definite permission to join on some later date, will forfeit his right to admission.

No replies will be given to any telegrams or letters enquiring the results of the entrance examination. A copy of the printed result will be sent to each candidate when published.

9. The following is the list of the four subjects for the Roorkee Entrance Examination. They are the same for both English and Indian candidates. The examination will be held by means of papers at the following centres only, *viz.*, Roorkee, Allahabad, Lucknow, Agra, Naini Tal, Mussoorie,\* Lahore, Rangoon, Nagpur and Shillong.

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\* The fixing of Mussoorie as a centre is conditional on seven candidates being forthcoming.

Candidates from the United Provinces will be allowed to appear at any centre of their choice in the United Provinces; while those residing outside the United Provinces will appear at centres, if such exist, within their province, or failing that, at the centre nearest to their province. The papers will be sent from Roorkee about the 15th of May to the officers who are appointed to conduct the examination:—

### SUBJECT No. 1. LANGUAGES (250).

#### (a) ENGLISH COMPOSITION (100).

Each candidate will write a short essay on a given subject. The subject will not be one requiring deep knowledge or thought, but the test will indicate whether the candidate has the power of expressing his ideas in good English. Quality and not quantity should be aimed at, and one copy book only should be used. Long quotations should be avoided. Quotations, if introduced, should be brief and have a distinct bearing upon the subject chosen. Marks will be deducted if these instructions are not strictly adhered to. Marks will also be deducted for unnecessary or faulty repetition, bad handwriting, and errors in spelling. Careless work and much crossing out will be penalised as indicated in para. 8 of the instructions printed on the cover of the examination book.

#### (b) PRECIS WRITING (100).

(i) *Precis*.—A simple printed passage or passages will be set before the candidate and he will be expected to give in as few words as possible—a definite number is usually fixed *which must not be exceeded*—the leading ideas expressed in the printed paragraphs. No marks will be allotted to any candidate who quotes, *verbatim*, any of the sentences given in the printed passages.

(ii) *Paraphrasing*.—Each candidate will be required to explain simply and briefly in his own way the meaning of the examples set. The precautions given under *Precis Writing* apply also to *paraphrasing*.

#### (c) HINDUSTANI (50).

Translation of extracts, in the Persian or Hindi character, from an easy Hindustani book, and of easy English sentences into colloquial Hindustani, and grammatical questions. Full marks will not be given to candidates unable to write the Persian or Hindi character, but the Hunterian system of transliteration may be adopted.

\*  
SUBJECT No. 2. MATHEMATICS (400).

(a) ARITHMETIC AND MENSURATION (80).

(i) *Arithmetic*.—Candidates will be expected to be familiar with all the general arithmetical principles and able to solve any arithmetical problem. Special value will be attached to the correct use of decimals and approximate methods in calculation. (40% marks).

(ii) *Mensuration*.—General principles of measurement of lengths, areas, and volumes. Determination of lengths of chords and arcs of a circle. Areas of plane rectilineal figures, segments and sectors of a circle, surface of a cone, cylinder, zone of a sphere. Volumes of parallelepiped, prism, pyramid, cone, cylinder, frustum of a cone, segment of a sphere. Special value will be attached to abridged methods of calculation. (60% marks).

(b) ALGEBRA (80).

Fundamental laws and definitions, methods of addition, subtraction, multiplication, and division. Factors, remainder theorem, and elementary properties of integral algebraical expressions. Highest common factor and lowest common multiple. Elementary properties of fractions, simple quadratic, and simultaneous equations and elementary theory of equations, elementary elimination. Simple graphical solutions. Extension of index law to fractional and negative indices. Elementary properties of surds and imaginary expressions. Involution and Evolution. Elementary propositions in ratio, proportion and variation. Elementary progressions and systems of numeration. Permutations and combinations. Elementary properties of logarithms. Proof of the binomial theorem for a positive integral exponent and the use of the binomial theorem and exponential theorem for any index. Elementary theory of convergent and divergent series. Elementary partial fractions. Graphical representation of simple functions.

(c) GEOMETRY (80).

Candidates will be expected to be familiar with the subject-matter of Euclid Books I—IV, VI and XI, and to be able to give proofs of the propositions. Candidates will also be expected to solve simple riders and to apply the propositions practically in the solution of easy graphical problems requiring geometrical drawing.



Book recommended, Hall and Stevens' School Geometry or any other book of approximately the same standard.

(d) TRIGONOMETRY\* (80).

Methods of measuring angles. Trigonometrical ratios and their values in special elementary cases. General properties of the ratios and identical relations between them. Formulæ for ratios of multiple and sub-multiple angles. Elementary relations between ratios and circular measure. Elementary properties of triangles. Use of logarithms and trigonometrical tables. Solution of triangles, heights, and distances. Elementary properties of quadrilaterals and regular polygons. Elementary inverse notation. Solution of equations. De Moivre's theorem.

(e) PLANE CO-ORDINATE GEOMETRY (80).

Elementary Co-ordinate geometry of the straight line and the circle (both in Cartesian and polar co-ordinates), including also the elementary properties of the Parabola and the Ellipse (in Cartesian co-ordinates only).

SUBJECT No. 3. SCIENCE (300).

(a) MECHANICS (100).

Definitions of velocity, acceleration, relative velocity, angular velocity, etc. Measurement of such quantities when uniform or variable, and their graphical representation by means of curves. Motion under constant acceleration. Law of impact.

Laws of motion and derivation of dynamical unit of force. Simple propositions and problems on work, energy, etc. Fundamental and derived units. Parallelogram law for the composition of velocities, acceleration, forces. Resultant of concurrent forces, triangle of forces, polygon of forces, and funicular polygon. Moments and elementary propositions connected therewith. Resultant of parallel forces, couples, and their fundamental properties. Reduction of a set of coplanar forces, and conditions for equilibrium. Determination of centres of gravity in simple cases. Elementary machines and application of principle of work. Friction and its laws. Motion of projectiles neglecting air resistance. Circular motion, normal and tangential accelerations of a point moving along a curve. Properties of hodograph.

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\* No books of any kind are allowed in the Examination halls. Logarithmic tables required will be supplied by the officer conducting the examination.

Rate of description of areas under central force. Simple harmonic motion, and time of oscillation of a simple pendulum. Potential energy and conservation of energy in elementary cases. Elementary moments of inertia.

(b) PHYSICS (100).

*General.*—Simple physical measurements; mass and weight; density and specific gravity of solids, liquids and gases; barometry.

*Heat.*—Heat and temperature; thermometry and calorimetry; expansion and contraction with variations of temperature; changes of state—fusion, evaporation, boiling point and vapour pressure, latent heat; conduction; convection; radiation; mechanical equivalent of heat.

*Sound.*—The production and propagation of sound; nature of wave motion; amplitude, wave length, frequency; pitch; reflection of sound; resonance; determination of velocity.

*Light.*—Propagation; reflection and refraction; critical angles; mirrors and lenses; spectrum; simple telescope, microscope, spectroscope, and photometers

*Magnetism.*—Properties of magnets; induction; magnetic field; lines of force; the law of magnetic force; magnetic moments; the Earth a magnet.

*Electricity.*—Conductors and insulators; electrification by friction and induction; influence machines; distribution of electrical charge on conductors; attraction; repulsion; potential; electrical capacity; primary cells; properties of the electric current, *i.e.*, chemical, magnetic and heating effects; currents and resistance measurements, Ohm's law; series and parallel connections; shunts.

No practical examination is prescribed, but all candidates are expected to have previously undergone an elementary course of practical work in a laboratory.

(c) CHEMISTRY (100).

General properties of matter; simple and compound substances; laws of chemical combination; acids, bases and salts; metals and non-metals; combustion, oxidation and reduction; atomic and molecular weights; chemical equivalents; the atomic theory; symbols; formulæ; simple chemical equations; Avogadro's rule; Dulong and Petit's law; Boyle's

law; Charles' law; vapour density; diffusion; an elementary knowledge of solution, dissociation and electrolysis.

The preparation, general properties and principal compounds of hydrogen, oxygen, nitrogen, the halogens, carbon, sulphur, phosphorus and silicon.

No practical examination is prescribed, but all candidates are expected to have previously undergone an elementary course of practical work in a laboratory.

#### SUBJECT No. 4. DRAWING† (200).

##### (a) GEOMETRICAL DRAWING (100).

The whole of practical plane Geometry including all classes of scales, also plain block letter printing and writing.

##### (b) FREE ARM DRAWING (100).

- (i). Free Arm Drawing in pastel, of common objects in nature such as an orange, a mango, an apple, household utensils, athletic gear and ordinary carpentry or smith's tools, etc. (75 % marks).

(Book recommended, "Pastel Drawing," Isaac Pitman & Co.).

- (ii). A simple example in *Memory* drawing. (25 % marks).

*N.B.—Half the full number of marks in each of the three subjects, Languages (English Composition and Précis combined), Mathematics, and Drawing, and in the aggregate is required for passing. No minimum of marks is prescribed for any of the other subjects; but the marks in no paper in which less than one quarter of the full number of marks has been obtained shall be allowed to count. Candidates will be expected to write a clear, legible hand. Up to one-tenth of the marks of each paper will be deducted for slovenly work.*

10. Sixteen scholarships of Rs. 50 a month are sanctioned for this class. Of these scholarships six will be awarded to first-year students, five to second-year students, and five to third-year students.

These scholarships are awarded to first-year students on the results of the Entrance Examination, and to second and third-year students on the results of the examination of the first and second year's work, and are tenable for the nine months of the College session. All the scholarships are reserved for candidates who have been resident in the United Provinces for three years at the time of their applications for the Entrance Examination of this class.

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† Particular attention is called to this subject in which many candidates fail to qualify.

11. A College tuition fee of Rs. 24 per mensem will be paid during the session by each student of the Class irrespective of his domicile. Students from Provinces or States outside the United Provinces will apply through the Government of the Province or State in which they reside for permission to appear at the College Entrance Examination and, provided in the event of such students gaining a place in the examination entitling them to admission, the Government or State concerned agrees to pay a contribution towards the cost of their training based on actuals of the preceding financial year. The only exceptions to this rule will be where the United Provinces Government agree in special cases to waive this contribution, or the students themselves agree to pay it.

12. Each English student, unless living with friends at Roorkee, will be required to join the Engineer Class Mess. Indian students make their own arrangements for messing.

13. Students are encouraged to take up military training by joining the Indian Auxiliary Force. In the case of those students who do not elect for military training a course of Physical Drill will be compulsory.

14. It is desirable that every student should be able to swim before joining the College.

15. Each student on admission is required to make a deposit in the College Treasury of Rs. 100, as an advance towards the purchase of the necessary class books for his own use. The books thus furnished to the student will be his own property. He should on joining the College, be provided with a good set of drawing instruments.

16. Quarters are provided for all students of the Civil Engineer Class in hostels near the College, a student being given a room to himself for a rent of Rs. 5-8 per mensem. If two students of this class share a room, each is charged a rent of Rs. 4 per mensem; it is desirable, however, that each student should have a room to himself, and separate rooms are provided as far as suitable accommodation is available. The hostels have been electrified, the charges being Rs. 2 per light and Rs. 4 per fan per month. Students should provide their own fans.

17. A limited number of sets of furniture, as detailed below, are

available for issue to students in order of seniority for which a monthly rental of Rs. 2-8 is charged :—

				<i>European student.</i>	<i>Indian student.</i>
1 Bed with mosquito poles and mattress	...	...	1	1	
1 Chair	...	...	1	1	
1 Easy chair	...	...	1	1	
1 Table	...	..	1	1	large table
1 Small table	...	...	...	1	
1 Combined chest of drawers, dressing table, and looking-glass			1	1	
1 Wash-hand stand	...		1	1	
1 Tub	...	...	1	1	

Students should arrange to bring their own mosquito nets, and durries.

18. Any candidate before he can be allowed to join the College must satisfy the Principal that he has sufficient means to defray his expenses during his course at Roorkee. A monthly allowance of Rs. 177 should suffice for ordinary expenses of English students, and Rs. 122-12 for Indians.

Any student failing to keep his accounts up to date, or to make sufficient progress in his course of study, will be suspended or ultimately removed from the College.

19. The College year usually commences on 16th October and closes on the 15th July. Candidates admitted to the College on the results of the Entrance Examination held in June will join on the 16th October following.

20. Students in the Civil Engineer class are trained for the Indian Service of Engineers of the Public Works Department, India, and for the Provincial Engineering Service of that department. They are also trained in the Civil Engineering profession generally, and many have gained employment outside India.

21. *The Civil Engineering Course extends over three years.*—In the third year in June the Final Examination is held when those students who have completed their course of study and have qualified will receive certificates to that effect.

Every candidate for apprenticeship in the Public Works Department must be examined by a medical board at Roorkee, after passing the final examination, and will be required to pay the fee required for his examination by that Board.

A fee of Rs. 40 is payable in the third year in April by each student who intends to appear for this examination. If a student, having paid the fee, does not eventually appear for the examination, the fee will not be refunded.

22. No student will be eligible for any college academic prizes unless he completes his course concurrently with the students who entered the College in the same year.

23. For the purpose of qualifying for possible appointments to the India-recruited branch of the Indian Service of Engineers in the Public Works Department, qualified Civil Engineer students of the Thomason College will be required to appear for a competitive examination to be held by the Government of India in October or November each year. Successful students will be allotted to the several Local Governments and Administrations to the number considered advisable by Government.

*Note.*—Detailed rules regarding the examination will be issued later.

24. Recruits for the provincial engineering service will be selected by the Local Governments and undergo a course of practical training for two years. During the first year of their training they will be granted such subsistence and travelling allowances as may be fixed by the local Government concerned. The candidates selected for appointment to the provincial engineering service will be on probation during their second year of training, will be classed as Assistant Engineers will draw pay as such and will be reckoned against the cadre of the service. The allowances will be continued during the second year of training to candidates not selected for appointment to the service but who are considered by the local Government to have justified their retention under training for a second year.

An officer's seniority on appointment to a provincial engineering service will be fixed with regard to the date on which he is appointed an Assistant Engineer, except that when two students of the same year are appointed as Assistant Engineers to the same province, their relative position for seniority will be regulated according to the order of standing at the final examination of the College, provided there has been no unreasonable delay on the part of the officer who took the higher place in joining his appointment for a course of training.

25. The list of the text-books, etc., used in the Civil Engineer classes of the College, which are procurable at the College Book Depôt, is shown under initial expenses. Application should be made to the Curator of the Book Depôt. The prices quoted are charged to persons in the College and exclude packing charges and postage from the prices applying to outstation orders.

26. Students are prohibited from parting with their books and drawing instruments before or during their year of training.

27. Drawing instruments, drawing boards, T-squares, etc., are procurable at the Canal Foundry and Workshops and the Bazaar: every student must provide himself with these at his own cost. Surveying instruments are supplied free of cost for the use of students while at the College.

28. Any student who is expelled from this College for misconduct will not be allowed to appear in any examination conducted by this College.

29. Students will not be permitted to appear for any external examinations during their College course.

30. Students will be tested in Riding before the completion of their College course.

*Forms required to accompany a candidate's application for admission to the Thomason College, Roorkee, are shown below and blank forms are obtainable on application on pre-payment of  $\frac{1}{2}$  anna postage.*

(1) STATEMENT SHOWING AGE, EDUCATION, ETC., OF CANDIDATE.

Name.	Date of birth.	Province of domicile of the father and if father not living of guardian where he must have definitely settled and resided for a period of three years.	School or schools at which educated.	Name, profession, situation, residence of father or guardian showing relationship of latter to candidate	Centre selected in case of candidates of U. P.	Remarks.
1	2	3	4	5	6	7

I am willing to be vaccinated on admission

(Place and date.)

(Signature.)

- (2) Educational certificate.\*
- (3) Moral certificate.
- (4) Medical certificate in the form shown further.
- (5) A certificate of the recorded date of birth.
- (6) Declaration as Statutory Native of India in case of other than pure Indians.

#### FORM OF MEDICAL CERTIFICATE.

*I certify that I have carefully examined \_\_\_\_\_; that his eyesight is of the standard prescribed; † that he is fairly robust, and his constitution is sound, and that he has no disease, or bodily or mental infirmity, unfitting him now, or likely to unfit him in the future, for active outdoor service in the Public Works Department.*

N.B.—The above certificate must be signed, within a month before date of submission, by a Commissioned Medical Officer, or by a Medical Officer in charge of a civil station, and must include a description giving clearly the personal marks of identification of the candidate who has been medically examined. No other certificate will be accepted, nor will applications be entertained unless the above rules be strictly complied with.

† The standard prescribed is as follows :—

1. If myopia in one or both eyes exists, a candidate may be passed, provided the ametropia does not exceed 3·5D, and if, with correcting glasses not exceeding 3·5D the acuteness of vision in one eye equals  $\frac{6}{8}$  and in the other  $\frac{6}{8}$ , there being normal range of accommodation with the glasses.

2. Myopic astigmatism does not disqualify a candidate, provided the lens, or the combined spherical and cylindrical lenses required to correct the error of refraction, does not exceed 3·5D; the acuteness of vision in one eye, when corrected, being equal to  $\frac{6}{8}$ , and in the other  $\frac{6}{8}$ , together with normal range of accommodation with the correcting glasses, there being no evidence of progressive disease in the choroid or retina.

3. A candidate having total hypermetropia not exceeding 4D is not disqualified, provided the sight in one eye (when under the influence of atropine) equals  $\frac{6}{8}$  and in the other eye equals  $\frac{6}{8}$  with + 4D glasses or any lower power.

4. Hypermetropic astigmatism does not disqualify, provided the lens or combined lenses required to cover the error of refraction do not exceed 4D, and that the sight of one eye equals  $\frac{6}{8}$  and the other  $\frac{6}{8}$  with or without such lens or lenses.

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\* Copies properly certified by a Government gazetted officer will be accepted.



5. A candidate having a defect of vision arising from nebula of the cornea is disqualified if the sight of one eye be less than  $\frac{6}{12}$ . In such a case the better eye must be emmetropic. Defects of vision arising from pathological or other changes in the deeper structures of either eye, which are not referred to in these rules, may exclude a candidate.

6. A candidate is disqualified if he be unable to distinguish the principal colours (achromatopsia).

7. Paralysis of one or more of the exterior muscles of the eye-ball disqualifies a candidate for the service.

*[Full particulars of the course of study in this class are contained in a pamphlet which can be obtained on application to the Curator, Book Depôt.]*

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Each student will be required to purchase a copy of the Standing Orders of this College which is on sale in the College Book Depôt, at ten annas a copy, and ignorance of the rules therein contained will not be accepted as an excuse for breaking them.

ROORKEE :        }  
The 15th July, 1929.)

P. P. PHILLIPS, PH. D., F.I.C., I.E.S.,

*Offg. Principal, Thomason College.*

## Memorandum on Expenses of Students of the Civil Engineer Class.

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THE following information is published for the guidance of parents and guardians, and for their assistance in determining the *probable* expenses of a course of instruction at the College. Economical management is aided as far as possible by the College authorities. Books are provided for purchase by students on the best business terms obtainable at the College Book Dépôt.

*N.B.*—As books, etc., are not supplied by the Book Dépôt on credit, students can themselves pay cash.

It must be clearly understood that students cannot be permitted to remain in the College if their fees or bills of any kind are not paid promptly on demand. The probable expenses of a student while at the College are shown under three heads, *viz.*, the initial expenses at the beginning of each yearly term and the monthly current expenses and the final examination expenses.

The current monthly expenses for English students amount to about Rs. 177, *see* details. The expenses for servants and miscellaneous are beyond the control of the College staff. For Indians the fixed charges amount to Rs. 122-12. The charges except for servants and miscellaneous expenses and for mess in case of Indians must be paid before the 21st of the month to which they relate and any student in arrears on the first of each month will lose all marks for any examination that may occur between this date and that on which he clears his account. Guardians are advised to send the above amounts direct to the Principal, and, if convenient, the whole remittance intended for the student can thus be sent, and the balance will at once be made over to him.

## Initial Expenses.

*N.B.—List and prices liable to alteration. Prices shown are those charged to students in College. Class books lent by the College are not entered in this list.*

Detail.	Price.	Remarks.
	Rs. A. P.	
Box of Drawing Instruments ... ..	...	} Not available at College Book Depot. May be arranged elsewhere.
T-Square, 36" ... ..	...	
Set Squares, 45° and 60° ... ..	...	
Brushes and colours ... ..	...	
Two drawing boards ... ..	...	
Workshop tool set ... ..	...	
One ten-inch slide rule ... ..	...	
<b>Books—</b>		
1ST YEAR CIVIL ENGINEER CLASS.		
<i>Mathematics.</i>		
Gibsons Treatise on Graphs ... ..	...	
Fawdry and Durrell's Calculus for Beginners ... ..	4 8 0	Approx.
Smith's Conic Sections ... ..	...	
Morley's Mechanics for Engineers ... ..	4 13 0	Approx.
Jessop and Caunt's Elements of Hydrostatics ... ..	..	
<i>or</i>		
Loney's Elements of Hydrostatics ... ..	...	
Lea's Elementary Hydraulics ... ..	5 2 0	
Wood's Strength & Elasticity of Structural Members ... ..	9 14 0	
Andrew's Theory and Design of Structures ... ..	8 0 0	
Dynamics London C. U. P. ... ..	6 0 0	
<i>Civil Engineering.</i>		
Molesworth's Pocket-Book ... ..	4 4 0	
Roorkee Manual of Building Materials ... ..	1 8 0	
Ditto of Earthwork ... ..	1 10 0	
Ditto of Carpentry ... ..	1 14 0	
Ditto of Masonry ... ..	1 11 0	
<i>Surveying and Drawing.</i>		
Roorkee Manual of Surveying, Part I ... ..	3 7 0	
Ditto of Drawing, do. I ... ..	2 8 0	
Ditto ditto do. II ... ..	2 6 0	
<i>Applied Science.</i>		
Taylor's Student's Chemistry ... ..	3 8 0	} Approx.
Jones' Junior Course of Practical Chemistry ... ..	2 4 0	
The Tutorial Physics, Vol. II, Heat ... ..	6 2 0	} Approx.
Ditto Vol. III. Light ... ..	4 6 0	

*List of prices, etc.—(concluded).*

Detail.	Price.	Remarks.
	Rs. A. P.	
2ND YEAR CIVIL ENGINEER CLASS.		
<i>Mathematics</i>		
Fawdry and Durrell's Calculus for Engineers ...	4 8 0	Approx.
Lamb's Infinitesimal Calculus ...	13 10 0	
Wood's Theory of Structures ...	...	
Andrew's Further Problems in the Theory of Structures,	5 8 0	
<i>Civil Engineering.</i>		
Roorkee Manual of Irrigation Works, Vols. I. ...	3 14 0	
Ditto ditto do. do. II. ...	2 5 0	
Ditto of Railways ...	5 1 0	
Ditto of Estimating ...	4 10 0	
Ditto of Roads ...	1 15 0	
Ditto of Building Construction ...	1 1 0	
Ditto of Bridges with Steel Bridges ...	3 0 0	
Surveying, Part II ..	3 3 0	
Abney's Instruction in Photography ...	...	
<i>Applied Science.</i>		
Hatch's Mineralogy ...	4 4 0	} Approx.
Geikie's Geology ...	5 7 0	
<i>Electrical Engineering.</i>		
Davidge and Hutchinson's Technical Electricity ...	...	
Meare's Electrical Engineering (Practical) ...	15 0 0	
3RD YEAR CLASS.		
Concrete Plain & Reinforced by Taylor & Thompson	25 0 0	} Approx.
Reinforced Concrete Design, Faber and Bowie ...	27 0 0	
Roorkee Manual of Sanitary Engineering, Part I (Water-supply).	...	
	3 9 0	
Roorkee Manual of Sanitary Engineering, Part II (Sewerage and Drainage Works).	2 13 0	
Inglis' Book-keeping ...	2 2 0	
GENERAL.		
Standing Orders ...	0 10 0	
Surveying and Level Field Books and Note-books	3 11 0	
Entrance donation to Mess for the first and second year, each year.	10 0 0	English students only.
Yearly donation to Sports and Regatta Fund ...	3 0 0	All students.
Entrance donation to Recreation Club for the first and second year, each year.	10 0 0	Ditto.
Yearly donation to Indian Engineer Class Club ...	5 0 0	Indian students only.
Photography— <i>Voluntary subject</i> ...	50 0 0	Voluntary.

**Current Monthly Expenses for nine months only.****(a) European students.**

		Rs. A. P.		
Fixed charges.	College fee ...	...	24	0 0
	Rent and Conservancy ...	...	5	12 0
	Rent of College furniture ...	...	2	8 0
	Recreation Fund ...	...	10	0 0
	Mess subscription ...	...	11	8 0
	Billiards ...	Rs. 15	}	2 8 0
	Babu, for accounts ...			1 0 0
	Messing, three meals ...	...	46	8 0
	Mess contingencies ...	...	7	8 0
				Oil and Petrol lighting, fruit, etc.
	Bearer ...	...	16	0 0
	Bhisti ...	...	1	12 0
	Dhobi ...	...	4	0 0
	Sweeper ...	...	2	0 0
	Liquors and mineral waters ...	...	10	0 0
	Electric light ...	...	2	0 0
	Miscellaneous extra expenses ...	...	30	0 0
	Total ...	...	177	0 0

Variable. Re. 1-8 per diem.

Oil and Petrol lighting, fruit, etc.

Part wages, as students employ these servants in common.

Variable. Some students spend less than Rs. 10 but Rs. 10 is not extravagant.

Per point per month.

Added to cover miscellaneous extra expenditure.

**(b) Indian students.**

		Rs. A. P.		
Fixed charges.	College fee ...	...	24	0 0
	Rent and conservancy ...	...	5	12 0
	Rent of College furniture ...	...	2	8 0
	Recreation Fund ...	...	10	0 0
	Indian Engineer Class Club ...	...	3	0 0
	Messing ...	...	35	0 0
	Servant ...	...	7	0 0
	Dhobi ...	...	2	0 0
	Sweeper ...	...	1	8 0
	Electric light ...	...	2	0 0
	Miscellaneous extra expenses ...	...	30	0 0
	Total ...	...	122	12 0

Cost is somewhat higher usually for Mohamedans and Sikhs.

Part wages, as students employ these servants in common.

Per point per month.

Added to cover miscellaneous extra expenditure.

NOTE.—A charge of Rs. 4/- per month is made for current for each electric fan in use during the hot weather.

**(c) Additional non-recurring expenses for both European and Indian students.**

- (i) Fee charged to each 3rd-year student in April for appearing for the Final Examination

Rs. A. P.

40 0 0

- (ii) Initial cost of instruments of books, vide list given.

Variable according to those purchased.

ROORKEE :  
The 15th July, 1929.

P. P. PHILLIPS, PH. D., F.I.C., I.E.S.,  
Offg. Principal, Thomason College.

## THOMASON CIVIL ENGINEERING COLLEGE, ROORKEE.

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### Supplement to the Civil Engineer Class Circular. 1929.

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The following explanatory notes are printed as a supplement to the Civil Engineering Class Circular to enable teachers and candidates to understand what is meant and required under the new course in Drawing.

(a). *Geometrical Drawing*.\*—The standard will be slightly higher than that of the Higher School Examination of the Board of High School and Intermediate Education, United Provinces. Candidates will be asked to answer in pencil, *not in ink*, about six questions on a quarter sheet of cartridge paper, size 13" × 10".

(b). *Free-Arm Drawing*.—Drawing on toned paper objects direct from nature in pastles or colours (white also may be a medium); the objects should usually be life size. The standard will be that of the High School Examination of the Board of High School and Intermediate Education, United Provinces. The following are examples of objects :—

Gloy bottles, cigarette tins, match boxes, hair brushes, parcels tied with string, books, ink bottles.

Drawing should not be outlined with a *pencil* or *charcoal*, but with a medium of the correct colour.

*Memory Drawing*.\*—One of the best exercises is to take a drawing away from a student, remove the object and then ask him to give a quick hand-sketch of the object he has just drawn, the idea being to train the faculties of observation and the perception of things in general. Or ask a class, one by one, to draw on the board a nib, a brush, key or

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\* See Prospectus Arts, Science, Commerce and Agricultural examinations of the Board of High School and Intermediate Education, United Provinces.

any other common everyday object with which he is familiar noting proportions, and as an examination to name as many fixed objects as he knows exist in the gymnasium, playing-field, dining hall or in the school room even to the number of steps, doors, windows, desks, etc. It will be found that the drawing of small objects will come naturally when once the powers of observation have been aroused.

Short exercises in *Memory drawing* will improve Free-arm drawing and the alertness and keenness of the scholar in general; they will also inculcate a sense of proportion which is wanting in the average student.

*Materials.* A set of pastels of 8 to 10 colours costing about eight annas, paper of toned variety, to suit the subject, known as "Pastleloid" which is of the quality of brown packing-paper costing about 2 annas a large sheet. Brown packing-paper is a very good substitute if it is not glazed. Light greys and browns are the most popular tints.

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*The rules in this Circular are liable to revision without notice in view of possible changes in the Course of Study, orders of Government, etc.*

[ C I R C U L A R . ]

THOMASON CIVIL ENGINEERING COLLEGE,  
ROORKEE.

1929.

*These rules apply to admissions in 1930.*

**OVERSEER CLASS.**

1. Under the recent orders of Government there is in future to be only one Subordinate Engineering Service in the Public Works department in place of an Upper Subordinate Service and a Lower Subordinate Service. A new class entitled "The Overseer Class" has now been constituted at the College to meet the requirements of the new service, and of the public demands for a class of men trained to a standard intermediate between the two old classes.

*Note.*—The new Subordinate Engineering Service will, at first, receive recruits trained at the Thomason College, Roorkee, but the class may be transferred to another station in the near future.

2. Candidates for admission to this class must not be under 16 or above 21 years of age on the 1st June immediately preceding the entrance examination of this College in which they wish to appear.

The age of a candidate will be taken from the original University records, and for candidates who have not appeared for a University examination, from College, or, failing a College, from school records. No alterations in the records will be recognized except in the case of purely clerical errors. Application for the examination must be accompanied by a true copy of University, College or school registers, as the case may be, signed by the Registrar, Principal or Head Master, and under no circumstances will any alteration be accepted to the advantage of the candidate.

3. The class is intended primarily for Europeans, Anglo-Indians and Indians resident within the United Provinces. Candidates from other provinces of India or Burma will only be admitted when vacancies in the class remain after the claims of all candidates resident in the United Provinces have been considered.

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*Note.*—To constitute residence in a particular province or state the parent or guardian of a candidate for admission to this College must have definitely settled and resided there for a period of three years.

*Note.*—This circular is supplied only on pre-payment of  $\frac{1}{4}$  anna postage, to be enclosed with each application.



4. Applications for admission should reach the Principal, *complete in all respects, not later than the 1st May* preceding the entrance examination, accompanied by a statement of—

The date of birth of the candidate.

The school or schools at which he has been educated.

The profession, situation, relationship and residence of his father or guardian.

One of the three examination centres he wishes to be examined at *vide* paragraph 10).

**N.B.—No notice will be taken of applications which are not complete in every respect, nor will any correspondence be entered into concerning them.**

5. Every candidate will be required to produce testimonials (copies properly certified by a Government gazetted officer will be accepted), which will not be returned, of good moral conduct, under the hand of the instructor under whom he has been educated, or of some other superior under whom he may have been employed or brought up; and these testimonials should have reference especially to his conduct during the two years immediately preceding his application for admission.

6. The qualifying tests for admission to the entrance examination will be the High School examination conducted by the Board of Education, United Provinces, or the School Leaving Certificate examination of this province or the Matriculation examination of the Allahabad University (or equivalent examination of other provinces at present recognized by the Allahabad University for purposes of Matriculation). In the case of European candidates, the Senior Cambridge examination or the High School Final examination under the Code of Regulations for European schools in force in Bengal, Bombay and Madras Presidencies, the United Provinces, Punjab or Central Provinces will also be recognized.

7. In case of pupils of Government schools who have passed as “Teachers’” certificates must be furnished that three years have elapsed since they left the Normal School, or they must furnish an order from the Inspector of Schools of their district authorizing their application to enter this College.

8. A “registration” fee of Rs. 10 must accompany the candidate’s application for examination. In no circumstances will this fee be refunded to the candidate.

9. A medical certificate must be furnished in the form printed after paragraph 31; no other will be accepted,

10. The candidate must be acquainted with both the English language and the vernacular of Upper India, and able to speak, read and write them with tolerable ease and accuracy. He must pass an entrance examination in the following subjects, which will be held in the first week in June, at the following centres, *viz.*, Roorkee, Agra, Lucknow, Allahabad and at any other centres, at the discretion of the Principal. Candidates from the United Provinces will be allowed to appear at any centre of their choice in the United Provinces; while those residing outside the United Provinces will appear at centres, if such exist, within their province, or failing that, at the centre nearest to their province. Examination papers will be sent from Roorkee about the 15th of May to the officers appointed to conduct the examination:—

	<i>Full marks</i>
English Composition (Essay) .. .. .	50
English Dictation (neatness, correct spelling, punctuation and writing will be taken into account) .. .. .	50
Arithmetic. Candidates will be expected to be familiar with all the general arithmetical principles, and able to solve arithmetical problems .. .. .	100
Algebra. Fundamental laws and definitions. The methods of addition, subtraction, multiplication and division, H. C. F., L. C. M., factors, fractions, simple and elementary simultaneous equations .. .. .	100
Geometry. Euclid, Books I and II, and simple riders .. .. .	100
Drawing, Printing, scales and simple geometrical figures (as in the Thomason College, Roorkee, Drawing Manual, Part I, Chapters I—IV) .. .. .	100
Hindustani. Translation of extra t in Hindi or Persian characters, from any easy Hindustani book and of easy English sentences into colloquial Hindustani, and grammatical questions .. .. .	100
Total of Marks ..	<u>600</u>

*N. B.*—One-third of the marks in each subject and one-half of the total marks are required for passing.

11. Any candidate who, after being duly notified, fails to join the College on the day fixed for the re-opening of the session, or, who before that date fails to obtain from the College authorities definite permission to join on some later date, will forfeit his right to admission.

12. No degree, certificate, etc., obtained by him at any other institu-

tion will entitle a candidate to enter this College, nor will it exempt him, in whole or in part, from the entrance examination above detailed.

13. Each examination is complete in itself, and no credit for marks gained in one examination is carried on to any other examination. A candidate who has failed in, or withdrawn from, an examination after his name has been registered, and presents himself for examination on a subsequent occasion, must undergo the full examination and furnish a fresh fee and certificates.

No replies will be given to any telegrams or letter enquiring the results of the entrance examination. A copy of the printed result will be sent to each candidate when published.

14. In this class a College fee of Rs. 6 a month during the session will be charged to students admitted through the entrance examination. All students of this class will be provided with quarters in the College hostels at a monthly rent of Re. 1 ; but no member of a student's family is allowed to reside in them with him.

The hostels have been electrified, the charges being Rs. 2 per light and Rs. 4 per fan, per month. Students should provide their own fans.

15. For this class there will for the present be 40 vacancies every year.

16. There will be 8 scholarships of the value of Rs. 25 per mensem, each tenable for the nine months of the College session, awarded annually on the results of the entrance examination and on the first year's Final examination.

17. Each student will make his own arrangements for the purchase of the necessary class books and instruments. The probable expense of these may amount to about Rs. 200 (*vide* details on page 9) during their course of study, and no one should present himself for admission who is not prepared to meet the above charges, as well as those of feeding himself, and dressing in decent and clean apparel.

18. The course for each student will be two years at the College devoted to a theoretical training.

If at any period of the course their conduct is unsatisfactory, or if they fail to make sufficient progress in their studies, they will be suspended or removed from the College.

19. Those who are selected for training by the Senior Chief Engineer as probationers for the United Provinces Subordinate Engineering Service will undergo a further year's practical training on works, and will be entitled "Apprentice Overseers."

20. The College session commences on the 16th October and ends on the 15th July following. At the end of the first session long and searching examinations will be held, and no student who fails in the standard prescribed for the first year course will be allowed to continue his studies at the College. At the close of the second session the Final examinations will be held.

21. The College vacation will be from the 16th July to the 15th October. Students will not be allowed to stay in the College hostels during the vacation, but must go home to their relatives or friends.

22. There will be two classes of certificates awarded on the results of the Final examination :—

I. The Higher Certificate, awarded to students obtaining at least 50 per cent. in each group and 60 per cent. on the total marks.

II. The Ordinary Certificate, awarded to students obtaining at least 33 per cent. in each group and 50 per cent. on the total marks.

23. The selected Apprentice Overseers will spend the third year of their training in acquiring the practical part of their education. They will be sent out to large and important works and placed under the charge of an experienced instructor.

During the third or apprentice year they will retain their position as students and will continue to be borne on the College lists. They will receive a salary of Rs. 40 per mensem.

24. The apprentices will keep notes of the works they are instructed on, which they will submit monthly with a diary of occupation, through the instructor and Executive Engineer, to the Principal at Roorkee. These officers will note on the diary their opinions regarding the apprentice's application to work and conduct, and the appointment of each apprentice to the Public Works Department will depend on his steadiness, temper, intelligence, industry and *practical* knowledge of the descriptions of work in which he has been instructed. The Senior Chief Engineer will finally decide which apprentices are fitted for permanent appointment to the Public Works Department.

25. On the conclusion of one year's training on the works the approved apprentices will be appointed on probation for one year and thereafter, if their work has been considered satisfactory, be permanently appointed to the Subordinate Engineering Service of the Public Works Department, United Provinces. The pay of this service has been fixed at Rs. 80—7—227 per mensem with two efficiency bars when the stages of Rs. 129 and 178 are reached. Overseers on probation will draw Rs. 80 per mensem and the first increment will be granted on confirmation.

26. Travelling allowance at the sanctioned rates will be paid to apprentices for the distance from Roorkee to the site of the works on which they are to serve, and again from this site to the stations where they are to be employed permanently as subordinates.

27. The list of the text-books, etc., used in this class, and which is procurable at the College Book Depôt, is shown under initial expenses. Application should be made to the Curator.

28. Drawing instruments, drawing boards, T-squares, etc., are procurable at the Canal Foundry and Workshops and the bazaar. Every student must provide himself with these at his own cost. Surveying instruments are supplied free of cost for the use of students while at the College.

29. Any student who is expelled from this College for misconduct will not be allowed to appear in any examination conducted by this College.

30. It is desirable that every student should be able to swim before joining the College.

31. Students will not be permitted to appear for any external examinations during their College course.

32. Students will be tested in Riding before the completion of their College course.

*Forms required to accompany a candidate's application for admission to the Thomason College, Roorkee, are obtainable on application on pre-payment of  $\frac{1}{2}$  anna postage.*

(1) Statement showing age, education, etc., of candidate :—

Name.	Date of birth	Province of domicile of the father and if father not living, of guardian where he must have definitely settled and resided for a period of three years.	School or schools at which educated.	Name, profession residence of father or guardian showing relationship.	Remarks.
1	2	3	4	5	6

I am willing to be vaccinated and (in the case of European students) inoculated on admission.

(Place and date)

(Signature).

(2) Educational certificate.\*

(3) Moral certificate.

(4) Medical certificate.

(5) A certificate of the recorded date of birth.

#### FORM OF MEDICAL CERTIFICATE.

*I certify that I have carefully examined \_\_\_\_\_; that his eyesight is of the standard prescribed;† that he is fairly robust, and his*

\* Copies verified by a Government gazetted officer will be accepted.

*constitution is sound; that he has no disease, or bodily or mental infirmity, unfitting him now, or likely to unfit him in the future, for active outdoor service in the Public Works Department.*

**N.B.**—The above certificate must be signed within a month before date of submission by a Commissioned Medical Officer or by a Medical Officer in charge of a civil station, and must include a description giving clearly the personal marks of identification of the candidate who has been medically examined. No other certificate will be accepted, nor will applications be entertained unless the above rules be strictly complied with.

The standard prescribed is as follows :—

1. If myopia in one or both eyes exists, a candidate may be passed, provided the ametropia does not exceed 3.5D, and if, with correcting glasses not exceeding 3.5D, the acuteness of vision in one eye equals  $\frac{6}{6}$  and in the other  $\frac{6}{6}$ , there being normal range of accommodation with the glasses.

2. Myopic astigmatism does not disqualify a candidate, provided the lens or the combined spherical and cylindrical lenses required to correct the error of refraction, does not exceed 3.5D; the acuteness of vision in one eye, when corrected, being equal to  $\frac{6}{6}$  and in the other  $\frac{6}{6}$ , together with normal range of accommodation with the correcting glasses, there being no evidence of progressive disease in the choroid or retina.

3. A candidate having total hypermetropia not exceeding 4D is not disqualified provided the sight in one eye (when under the influence of atropine) equals  $\frac{6}{6}$  and in the other eye equals  $\frac{6}{6}$ , with + 4D glasses or any lower power.

4. Hypermetropic astigmatism does not disqualify, provided the lens or combined lenses required to cover the error of refraction do not exceed 4D, and that the sight of one eye equals  $\frac{6}{6}$  and the other  $\frac{6}{6}$ , with or without such lens or lenses.

5. A candidate having a defect of vision arising from nebula of the cornea is disqualified if the sight of one eye be less than  $\frac{6}{12}$ . In such a case the better eye must be emmetropic. Defects of vision arising from pathological or other changes in the deeper structures of either eye, which are not referred to in these rules, may exclude a candidate.

6. A candidate is disqualified if he be unable to distinguish the principal colours (achromatopsia).

7. Paralysis of one or more of the exterior muscles of the eyeball disqualifies a candidate for the service.

[Full particulars of the course of study and syllabus of this class are contained in a pamphlet, which can be obtained on application to the Curator, Boo Depôt at eleven annas a copy.]

*Each student will be required to purchase a copy of the Standing Orders of the College, which is on sale in the College Book Depôt, at twelve annas a copy, and ignorance of the rules therein contained will not be accepted as an excuse for breaking them.*

ROORKEE : The 15th July, 1929.	}	P. P. PHILLIPS, Ph. D., F.I.C., I.E.S., Offg. Principal, Thomason College.
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## Memorandum on the expenses of students of the Overseer Class.

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The following information is published for the guidance of parents and guardians, and for their assistance in determining the probable expenses of a course of instruction at the College.

Economical management is aided as far as possible by the College authorities. Books are provided for purchase by students, on the best business terms obtainable at the College Book Dépôt.

*N.B.*—As books, etc., are not supplied by the Book Dépôt on credit, students can themselves pay cash.

It must be clearly understood that students cannot be permitted to remain in the College if their fees or bills of any kind are not paid promptly on demand.

The probable expenses of a student while at the College are shown under two heads, *viz.*, (i) the initial expenses of each yearly term, and (ii) the monthly current expenses.

With regard to current expenses, the regular monthly charges amount to about Rs. 10 (*see details*). The charges for messing, personal servants, and any other expenses the student may incur are beyond the control of the College staff.

The above-mentioned regular charges of about Rs. 10 must be paid before the 21st of the month to which they relate, and any student in arrears on the first of each month will lose all marks for any examination that may occur between this date and that on which he clears his account.

## (i) Initial expenses.

*N.B.*—List and prices are liable to alteration. The prices shown are those charged to students in College. Class books lent by the College are not entered in this list:—

Detail.	Price.		Remarks.
	Rs.	A. P.	
Box of drawing instruments .. ..			} Not available at College Book Depot. May be arranged elsewhere.
T-Square, 36" .. ..			
Set Squares, 45° and 60° .. ..			
Brushes and colours .. ..			
Drawing boards .. ..			
Workshop tools .. ..			
<b>BOOKS.</b>			
FIRST YEAR.— <i>Mathematics.</i>			
Kirkman and Field's Arithmetic for Schools ..	4	8 0	} Approx.
Hall and Knight's Elementary Algebra ..	4	4 0	
Hamblin Smith's Elementary Trigonometry ..			} Approx.
Pierpoint's Elementary Mensuration { Part I ..	1	14 0	
" " II ..	2	4 0	
Hall and Stevens' Geometry Part I to V ..	3	6 0	} Approx.
Roorkee Mathematical Tables .. ..	1	8 0	
Loney's Mechanics .. ..			
<i>Civil Engineering.</i>			
Molesworth's Pocket Book .. ..	4	4 0	
Roorkee Manual of Materials .. ..	1	8 0	
Ditto Earthwork .. ..	1	10 0	
Ditto Masonry .. ..	1	11 0	
Ditto Building Construction .. ..	1	1 0	
Ditto Carpentry .. ..	1	14 0	
Mitchell's 40 Lessons in Carpentry Workshop Practice			
<i>Surveying and Drawing.</i>			
Roorkee Manual of Surveying, Part I ..	3	7 0	
Ditto Drawing, Part I .. ..	2	8 0	
Ditto do do II .. ..	2	6 0	
<i>Natural Science.</i>			
Gregory's Class Book of Physics, Parts III and IV	2	0 0	
SECOND YEAR.— <i>Mathematics.</i>			
Building Mechanics, Sheppard .. ..	8	4 0	} Approx.
Roorkee Manual of Hydraulic .. ..	1	9 0	
<i>Civil Engineering.</i>			
Roorkee Manual of Roads .. ..	1	15 0	
Ditto Estimating .. ..	4	10 0	
Ditto Bridges with Steel Bridges ..	3	0 0	
Ditto Irrigation Works, Vols. I ..	3	14 0	
Ditto do do do II .. ..	2	5 0	
Ditto Railways .. ..	5	1 0	
<i>Sanitary Engineering.</i>			
Roorkee Manual, Part I, Water-supply ..	3	9 0	
Ditto do II, Sewerage and Drainage Works ..	2	13 0	
Mitchell and Davey's 40 Lessons in Engineering Workshop Practice .. ..			
GENERAL.			
Abney's Instruction in Photography .. ..	6	8 0	} For optional subject.
Standing Orders .. ..	0	10 0	
Furniture .. ..	10	0 0	} Half price usually recoverable on completion of College course Voluntary.
Photography—Voluntary subject .. ..	50	0 0	



## (ii) Current monthly expenses for nine months only.

*Indian students.*

			Rs. A. P.				
Fixed charges.	{	College fee ...	...	6	0	0	
		House-rent ...	...	1	0	0	
		Recreation Club	...	2	0	0	
		Newspaper „	...	0	12	0	
		Messing ...	...	15	0	0	Variable.
Servants—Cook	Rs. 1/8, servant	Rs. 1/8	3	0	0	Part wages, as students employ servants in common.	
	Dhobi ...	...	1	8	0		
	Barber ...	...	0	8	0		
	Electric energy	...	6	0	0	Rs. 2/- in Winter & 4/- in Summer.	
	Miscellaneous, about	...	9	4	0		
Total			...	45	0	0	

The above is for Indian students. For Europeans the monthly expenses would probably amount to Rs. 70.

ROORKEE :	}	P. P. PHILLIPS, PH. D., F.I.C., I.E.S.,
The 15th July, 1929.		Offg., Principal, Thomason College.

*The rules In this Circular are liable to revision without notice  
in view of possible changes in the Course of Study,  
orders of Government, etc.*

## [C I R C U L A R.]

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# THOMASON CIVIL ENGINEERING COLLEGE, ROORKEE.

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1929.

*These rules apply to admissions in 1930.*

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## DRAFTSMAN CLASS.

1. For admission to the Draftsman class an entrance examination will be held annually at the Thomason College as soon after the 16th October as possible; due notice of the dates on which the examination will be held will be given to all candidates. The subjects for the examination will be (1) Arithmetic, (2) English, (3) the preparation of simple Drawing scales and Italic printing, (4) Geometry and very simple Mensuration. The standard in these subjects, (except Drawing) will be that of the School Promotion Examination, Class VIII. The first ten on the list of passed candidates will be selected annually for admission to the Draftsman Class. No entrance fee will be charged for this examination. Indians of pure Asiatic descent who have not been resident for at least three years in the United Provinces are not eligible for admission to this class.

2. The minimum qualifying test for permission to appear for the Entrance Examination will be the School Promotion Examination in Class VIII. of an Anglo-Vernacular School. Candidates must submit a certificate signed by the Head Master of the school in which they have been educated, showing that they possess the minimum educational qualifications and are of good character, industrious and have an aptitude for Drawing.

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*Note.*—This Circular is supplied only on pre-payment of  $\frac{1}{2}$  anna postage, to be enclosed with each application.

In the case of candidates who cannot furnish the certificate signed by a Head Master, owing to their not being in a school, a certificate of good moral character and industrial aptitude will be accepted, if signed by any Government gazetted officer, and their educational fitness for the class will be tested on their presenting themselves at the College.

3. All candidates must furnish a certificate of sound health and physical fitness in the form given below. No other form will be accepted :—

#### FORM OF MEDICAL CERTIFICATE.

I certify that I have carefully examined \_\_\_\_\_ that his eyesight is of the standard prescribed,\* that he is fairly robust, and his constitution is sound, and that he has no disease, or bodily or mental infirmity unfitting him now, or likely to unfit him in the future, for active outdoor service in the Public Works Department.

*N.B.*—The above certificate must be signed, within a month before date of submission, by a Commissioned Medical Officer, or by a Medical Officer in charge of a civil station, and must include a description, giving clearly the personal marks of identification of the candidate who has been medically examined. No other certificate will be accepted.

The standard prescribed is as follows :—

1. If myopia in one or both eyes exists, a candidate may be passed, provided the ametropia does not exceed 3.5D, and if, with correcting glasses not exceeding 3.5D the acuteness of vision in one eye equals  $\frac{5}{16}$  and in the other  $\frac{5}{16}$ , there being normal range of accommodation with the glasses.

2. Myopic astigmatism does not disqualify a candidate, provided the lens or combined spherical and cylindrical lenses, required to correct the error of refraction, does not exceed 3.5D; the acuteness of vision in one eye, when corrected, being equal to  $\frac{5}{16}$  and in the other  $\frac{5}{16}$ , together with normal range of accommodation with the correcting glasses there being no evidence of progressive disease in the choroid or retina.

3. A candidate having total hypermetropia not exceeding 4D is not disqualified, provided the light in one eye when under the influence of atropine equals  $\frac{5}{16}$  and in the other eye equals  $\frac{5}{16}$ , with + 4D glasses or any lower power.

4. Hypermetropic astigmatism does not disqualify provided the lens or combined lenses required to cover the error of refraction do not exceed 4D and that the sight of one eye equals  $\frac{5}{16}$  and the other  $\frac{5}{16}$  with or without such lens or lenses.

5. A candidate having a defect of vision arising from nebula of the cornea is disqualified if the sight of one eye be less than  $\frac{5}{16}$ . In such a case the better eye must be emmetropic. Defects of vision arising from pathological or other changes in the deeper structures of either eye, which are not referred to in these rules, may exclude a candidate.

6. A candidate is disqualified if he be unable to distinguish the principal colours (achromatopsia).

7. Paralysis of one or more of the exterior muscles of the eye-ball disqualifies a candidate for the service.

4. Applications for admission should be submitted to the Principal during the month of September. None will be entertained which are received after the 30th September. Every application must be accompanied by the following statement and certificate :—

Forms required to accompany a candidate's application for admission are obtainable on application on pre-payment of  $\frac{1}{2}$  anna postage from the Thomason College, Roorkee.

(1) Statement showing age, education, etc., of candidate :—

Name.	Province of domicile of the father, and if father not living of guardian where he must have definitely settled and resided for a period of three years.	Date of birth	School or schools at which educated.	Name, caste, profession and residence of father or guardian.	Duration of previous training in school.	Signature of candidate.
1	2	3	4	5	6	7

I am willing to be vaccinated on admission.

(Signature of candidate).

(Place and date).

Signature of Head Master of School.

PAPERS, ETC., SUPPLIED HEREWITH.

(2) Certificate of character and education, etc., (*vide* paragraph 2).

(3) Birth certificate or affidavit.

(4) Medical certificate (*vide* paragraph 3).\*

5. Full discretion rests with the Principal to remove any student who appears to be unlikely to profit by the training. A removal under this rule will imply no reflection on the student's character.

6. The College session commences on the 16th October of each year. Accepted candidates should present themselves for the entrance examination on the date which will be notified to them : all are required to be present on that date, otherwise they will forfeit the right of admission. Their admission will depend on the results of the examination and they should join the class immediately after the results are notified.

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\* If desired, this certificate need not be forwarded by candidates until required of them by the Principal, but no student can join these classes without one.

7. Candidates will pay no fees and will be provided with free quarters, if available, but no member of a candidate's family will be allowed to reside in them with him.

8. No stipends will be given, but not more than twelve scholarships of Rs. 4 per mensem are available to be given at the discretion of the Principal to such candidates as show marked application and ability, and as have been resident in the United Provinces for three years at the time of their admission to this class. No apprentice can receive a scholarship till he has been in the College for three months, or may hold a scholarship for more than a year. No scholarship will be payable while an apprentice is on leave or vacation.

9. Tools and materials will be supplied free for the use of candidates, but remain the property of the College, and all work turned out during working hours will be the property of the College.

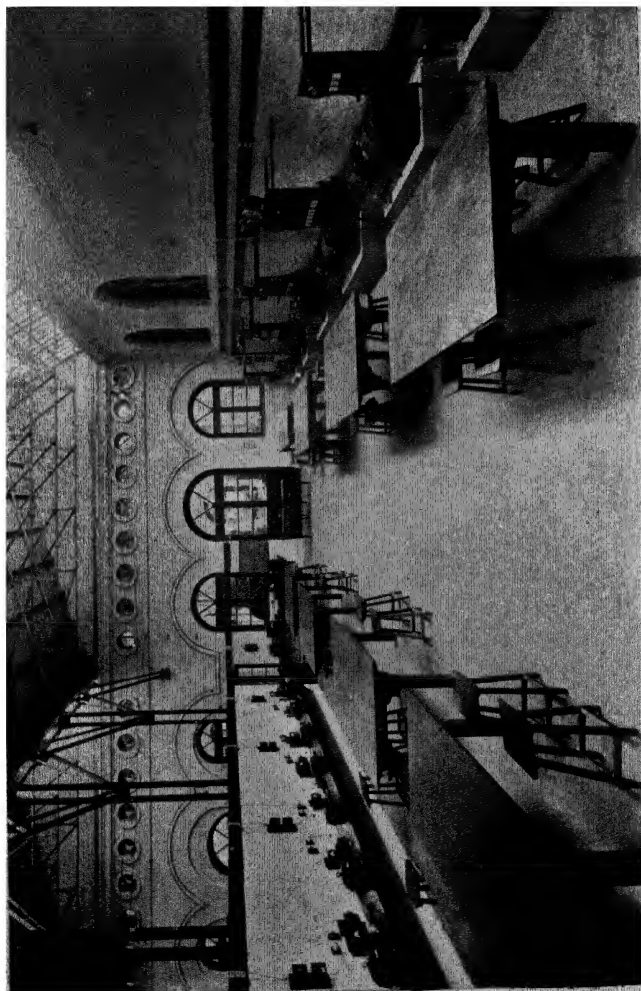
10. On completion of the course of training, students will be granted a certificate as "Draftsman" with "qualified in Simple Estimating" in the case of those students only who attain the requisite standard in the subject. The course of training for the Draftsman Class will extend over three years, but any candidate who gains admission, and, in the opinion of the Principal, is initially a good draftsman, may be allowed to join the class in the second year. The College does not undertake to find employment for any man, though it will give all the assistance it can. Certificate holders are expected to find employment for themselves in the open market. Any apprentice leaving before he is, in the opinion of the Principal, a skilled and competent workman, will, on no consideration, be given a certificate.

11. Any student who is expelled from this College for misconduct will not be allowed to appear in any examination conducted by this College.

*Each student will be required to purchase a copy of the Standing Orders of this College, which is on sale in the College Book Depôt, at ten annas a copy, and ignorance of the rules therein contained will not be accepted as an excuse for breaking them.*

ROORKEE :  
The 15th July, 1929.)

P. P. PHILLIPS, PH. D., F.I.C., I.E.S.,  
Offg. Principal, Thomason College.



NEW ELECTRICAL ENGINEERING LABORATORY IN COLLEGE WORKSHOPS.



# COURSE OF STUDY AND SYLLABUS.

## CIVIL ENGINEER CLASS, 1929-30.

THE chief points kept in view in arranging this course of study are, to ensure the necessity for steady work throughout the whole course, and to co-ordinate the instruction given in each subject so as to lead up to a thorough test of the qualifications necessary for a Civil Engineer of as high a grade as a College training can produce. special attention being paid to the local conditions of India. This test is represented by the Project and the Final Examinations.

Four-tenths of the total marks at the end of the 1st year are carried forward in each group to the 2nd year. Similarly, seven-tenths of the total marks at the end of the 2nd year are carried forward to the 3rd year. Continuous steady work is necessary to ensure qualification at the end of each year.

### Terms and Examinations.

#### FIRST TERM—

*College Attendances.*—From October 16th to a variable date in February.

*Examinations.*—Start on the 1st or 2nd Monday in February whichever falls nearest to the 7th of February.

#### SECOND TERM—

*College Attendances.*—Start on the Monday following the half Sessional Examinations and continue till about June 10th.

*Revision in Quarters.*—About June 10th to about June 17th.

*Examinations.*—About June 18th.

*Attendances.*—These are shown in the Time-table on pages 90 and 91.

The Course of Study extends over three years and comprises the following subjects grouped under six heads :—

GROUP	I., ...	... Civil Engineering.
	„ II., ...	... Pure and Applied Mathematics.
	„ III., ...	... Surveying and Drawing.
	„ IV., ...	... Applied Science.
	„ V., ...	... Mechanical and Electrical Engineering.
	„ VI., ...	... Physique.



The marks required at the end of the third year for certificate are as follows :—

- I. To obtain the Higher Certificate, the minimum pass marks of 33 per cent. in each Group in each year and in the Project, and 66 per cent. in the total must be earned. All students winning the Higher Certificate will receive preference for Government apprenticeships in the order of standing, and will be eligible for Government appointments.
- II. To obtain an Ordinary Certificate, the minimum pass marks of 33 per cent. in each Group in each year, and in the Project, and 50 per cent. in total must be earned. All students gaining the Ordinary Certificate will receive Government apprenticeships (as far as these are available) in the order of marks and merit, and will be eligible for Government appointments.

*To qualify for return to the College at the end of the first and second years*, students are required to obtain 33 per cent. of the marks allotted to each Group, and 50 per cent. of the total marks. A student failing to obtain this standard will not be allowed to return to the College unless his failure was due to prolonged absence through sickness, or other circumstances beyond his control, in which cases the sanction of Government will be required for his re-admission contingent on the recommendation of the Principal.

Photography is a voluntary subject and the marks obtained in this subject do not count in the total, but only for the photography prize.

The Examinations, the marks assigned to them, and the Time-table are shown on the following pages.

**EXAMINATION AND MARKS.***(First Year).***THEORETICAL.**

<i>1st half Session.</i>		<i>2nd half Session.</i>	
	Marks.		Marks.
1. Calculus and Analytical Geometry, ...	100	1. Applied Mechanics I., ...	100
2. Graphical Statics, ...	100	2. †Elementary Engineering, ...	100
3. Mechanics, ...	100	3. General Mathematics, ...	100
4. Applied Mechanics, ...	100	4. Calculus, ...	100
5. Survey Theory, ...	100	5. Analytical Geometry, ...	100
6. Physics, ...	100	6. Mechanics, ...	100
7. Theoretical Chemistry, ...	100	7. Applied Mechanics II., ...	100
8. Mechanical Engineering, ...	100	8. Drawing, ...	100
		9. Physics, ...	100
		10. Theoretical Chemistry, ...	100
		11. Mechanical Engineering, ...	100
	<hr/> 800 <hr/>		<hr/> 1100 <hr/>

**PRACTICAL AND CLASS WORK**

1. Class Work—Mathematics	100	1. Mathematical Note-books,	100
2. Survey Practical, ...	100	2. Class Work—Mathematics	100
3. Class Work—Physics, ...	50	3. Drawing, ...	200
4. Practical Chemistry, ...	100	4. Practical Physics, ...	150
5. Mechanics Laboratory, ...	100	5. Class Work—Physics, ...	50
		6. Practical Chemistry, ...	100
		7. Class Work—Chemistry, ...	100
		8. Mechanical Engineering, ...	100
	<hr/> 450 <hr/>		<hr/> 900 <hr/>
	<hr/> 1250 <hr/>		<hr/> 2000 <hr/>

**TOTALS.**

			Marks.
1st Term, ...	...	...	1250
2nd ,, ...	...	...	2000
		Grand Total, ...	<hr/> 3250 <hr/>

† Elementary Engineering. A paper on the application of mechanics to the solution of Simple Engineering problems.

**EXAMINATION AND MARKS.***(Second Year).***THEORETICAL.**

<i>1st half Session.</i>		<i>2nd half Session.</i>	
	Marks.		Marks.
1. Buildings,†	... 100	1. *Civil Engineering I.,...	100
2. Calculus and Differential Equations,	... 100	2. *Civil Engineering II.,...	100
3. Applied Mechanics,	... 100	3. *Civil Engineering III.,...	100
4. Hydraulics,	... 100	4. Estimating,	... 100
5. Survey Theory,	... 100	5. Calculus and Differential Equations,	... 100
6. Electrical Engineering,	... 100	6. Applied Mechanics,	... 100
7. Applied Chemistry,	... 100	7. Electrical Engineering,	... 100
8. Mechanical Engineering,	100	8. Geology and Mineralogy,	100
9. Descriptive Engineering,	100	9. Mechanical Engineering,	100
	<u>900</u>		<u>900</u>

**PRACTICAL AND CLASS WORK.**

1. Field Engineering,	... 100	1. Engineering Note-books and Class Work,	... 50
2. Class Work—Mathematics	100	2. Mathematical Note-books,	100
3. Survey,	... 250	3. Class Work—Mathematics	100
4. Class Work—Electrical Engineering,	... 50	4. Civil Engineering Design,	250
5. Mechanical Engineering Design,	... 200	5. Practical Electrical Engineering,	... 100
	<u>700</u>	6. Class Work—Electrical Engineering,	... 100
	1600	7. Class Work—Chemistry and Mineralogy,	... 100
		8. Mechanical Engineering,	100
			<u>900</u>
			<u>1800</u>

**TOTALS.**

1st Year, carried forward ( $\frac{4}{10}$ of 3250),	... 1300
2nd ,,	... 3400
Grand Total,	<u>4700</u>

\* I. Theory of Structures, (Building and Bridges). II. Hydraulics (Engineering).  
III. General Civil Engineering.

† Theory of Structures, (Buildings).

**EXAMINATION AND MARKS.***(Third Year).***THEORETICAL.**

<i>1st half Session.</i>		<i>2nd half Session.</i>	
	Marks.		Marks.
1. *C. E. I. Buildings, ...	100	1. *C. E. I. Buildings, ...	100
2. C. E. II. Irrigation, ...	100	2. C. E. II. Irrigation, ...	100
3. C. E. III. Reinforced Concrete, ...	100	3. C. E. III. Reinforced Concrete, ...	100
4. Sanitary Engineering, ...	100	4. Bridges, ...	100
5. Estimating, ...	100	5. Water-supply and Sanitary Engineering, ...	100
6. Curves and Hydro-Electric Surveys, ..	100	6. Survey I., ...	100
7. Astronomy, ...	100	7. „ II., ...	100
8. Electrical Engineering, ...	100	8. Mechanical Engineering, ...	100
9. Mechanical Engineering, ...	100	9. Electrical Engineering, ...	100
	<hr/> 900 <hr/>		<hr/> 900 <hr/>

**PRACTICAL AND CLASS WORK.**

1. Survey, ...	100	1. Accounts, ...	100
2. Civil Engineering Design, ...	250	2. Mechanical Engineering, ...	100
3. Class Work—Electrical Engineering, ...	100	3. Process Work, ...	100
	<hr/> 450 <hr/>		<hr/> 300 <hr/>
	<hr/> 1350 <hr/>		<hr/> 1200 <hr/>

**TOTALS.**

	Marks.
1st and 2nd Years' Marks ( $\frac{1}{10}$ of 4700), ...	3290
3rd Year's Marks, ...	2550
Project, ...	1250
Physique and General Fitness, ...	800
Grand Total, ...	<hr/> 7890 <hr/>

\* Theory of Structures, (Buildings).

The marks allotted to Civil Engineering Projects are 1250

Students will be required to qualify in the Projects by obtaining 33 per cent. marks of the aggregate.

There will be yearly two or three preliminary projects which will be examined by internal examiners, carrying a total of 450 marks, to be followed by a final project for which 800 marks will be awarded, to be examined and marked by an external examiner.

The gold medal will be awarded to the student obtaining the highest aggregate in all the projects.

*Marks for Physique and General Fitness.*

General Fitness entails discipline, punctuality, general conduct, and general fitness throughout the three years' course, as to management of coolies at work, etc. Over 10 % of the total marks for the whole three years' course are allotted to Physique and General Fitness, and the total marks earned, therefore, constitutes a very fair and true record of a student's intellectual and physical fitness for the work of an engineer.

Members of the A. F. I. and U. T. C. are marked for military

proficiency,	...	...	...	150
<i>Athletics.</i> —Proficiency in games and sports,	...	...	...	250
<i>General Fitness.</i> —Physical and moral fitness for work in the engineering profession,	...	..	...	400
Total, ...				800

\**Athletics.*—The 250 marks for proficiency in games and sports will be allotted as follows :—

Spirit of Sport,	...	...	100	Marks.
Swimming,	...	...	30	„
Athletic Sports,	...	...	30	„

*Games.*—(1) Boating, (2) Tennis and Squash Racquets, (3) Football, (4) Hockey, (5) Cricket. Any three will carry 90 marks.

**TIME-TABLES.**

# TIME-TABLES. 1st Half.

	Hour	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	Saturday.
1st Year	8-9	Mathematics Lec.	Mathematics Lec.	Survey Lec.	Mathematics Lec.	Mechanics Lec.	Physics Lab. B.
	9-10	Mechanics Lab.	Chemistry Lec.	Survey Tut.	Mechanics Tut.	Chemistry Lec.	Workshops A.
	10-11	Mech. Eng. Lec.	Mathematics Lec.	Physics Lec.	Mechanics Tut.	Mathematics Tut.	Physics Lec.
	11-12	Recess	Drawing Lec.	Recess	Mech. Eng. Lec.	Mathematics Tut.	Recess.
	12-1	Survey Lec.	{ Drawing Tut. A. Chemical Lab. B.	{ Workshops B. Physics Lab. A.	Recess.	Recess	{ Chemical Lab. A. Drawing Tut. B.
2nd Year	2-3	Survey Tut.		...	{ Chemical Lab. A. Drawing Tut. B.	{ Drawing Tut. A. Chemical Lab. B.	...
	3-4			...			...
	8-9	...	Survey Tut.	Mech. Eng. Lec.	...	Survey Tut.	Civil Eng. Lec.
	9-10	...	Survey Tut.	Chemistry Lec.	...	Survey Tut.	Mech. Eng. Lec.
	10-11	Civil Eng. Lec.	Survey Lec.	Appl. Mech. Lec.	Elect. Eng. Lec.	Survey Lec.	Appl. Mech. Lec.
3rd Year	11-12	Elect. Eng. Lec.	Survey Tut.	Recess	Mathematics	Survey Tut.	Recess
	12-1	Mathematics Lec.	Survey Tut.	Mathematics	C. E. Lec.	Survey Tut.	Mathematics Tut.
	1-2	Recess	Recess	Mech. Eng.	Recess	Recess	Mathematics Tut.
	2-3	{ Elect. Eng. Lab. A. Mech. Eng. Lab. B.	{ Mech. Eng. Lab. A. Elect. Eng. Lab. B.	...	Appl. Mech. Tut.	Mech. Eng. Design	...
	3-4			...	Appl. Mech. Tut.	Mech. Eng. Design	...
3rd Year	8-9	...	...	Elect. Eng. Lec.	...	...	Elect. Eng. Lec.
	9-10	...	...	Civil Eng. Lec.	...	...	Civil Eng. Lec.
	10-11	Survey Lec.	Mech. Eng. Lec.	Civil Eng. Lec.	C. E. Lec.	Sany. Eng. Lec.	Mech. Eng. Lec.
	11-12	Estimating	C. E. Lec.	Recess	C. E. Lec.	Civil E. Design	Recess
	12-1	Recess	Recess	{ Elect. Eng. Lab. A. Mech. Eng. Lab. B.	C. E. Tut.	C. E. Design	{ Mech. Eng. Lab. A. Elect. Eng. Lab. B.
3rd Year	1-2	Estimating	Recess	...	Recess	Recess	...
	2-3	Estimating	C. E. Design		Survey Lec.	Civil E. Tut.	
	3-4	Civil E. Lec.	C. E. Design	...	Survey Lec.	Civil E. Tut.	...

Note 1.—2nd Year Survey Camp—January 10 to February 10. Half-yearly Examinations start on February 10.  
 Note 2.—The 3rd Year students devote 8 hours weekly during the 1st session to practical work in Astronomy.

## 2nd Half.

1st Year.	2nd Half.				
	8-9 9-10 10-11 11-12 12-1 1-2	Mathematics Lec. Mathematics Tut. Physics Lec. Recess Drawing Tut. A. Physics Lab. B.	Mechanics Lec. Chemistry Lec. Mech. Eng. Lec. Recess Chemical Lab. A. Drawing Tut. B.	{ Drawing Tut. B. Physics Lab. A. Drawing Lec. Recess Drawing Tut. Drawing Tut.	Applied Mech. L. Chemistry Lec. Physics Lec. Recess Drawing Tut. A. Chemical Lab. B.
2nd Year	8-9 9-10 10-11 11-12 12-1 1-2	Mech. Eng. Lec. Civil Eng. Lec. I. Appl. Mech. Lec. Recess Civil Eng. Design I. Civil Eng. Design I.	Estimating Elect. Eng. Lec. Estimating Recess Appl. Mech. Tut.* Appl. Mech. Tut.*	Mathematics Lec. Geo. & Min. Lec. Geo. & Min. Lab. Recess Civil Eng. Design I. Civil Eng. Design I.	Civil Eng. Lec. {Elect. Eng. Lab. A. Mech. Eng. Lab. B. Recess Civil Eng. Civil Eng.
2nd Year *	8-9 9-10 10-11 11-12 12-1 1-2	Elect. Eng. Lec. Civil Eng. Design Civil Eng. Design Recess Civil Eng. Civil Eng.	Survey Lec. Survey Lec. Civil Eng. Tut. Recess Civil Eng. Civil Eng.	Survey Lec. Survey Lec. Civil Eng. Tut. Recess Civil Eng. Civil Eng.	Elect. Eng. Tut. Elect. Eng. Tut. Civil Eng. Design Recess Civil Eng. Design Civil Eng. Design
3rd Year †	8-9 9-10 10-11 11-12 12-1 1-2	Accounts. Elect. Eng. Civil Eng. Recess Civil Eng. Civil Eng.	Workshops. Workshops. Workshops. Recess Accounts. Accounts.	Accounts. Accounts. Elect. Eng. Recess Civil Eng. Civil Eng.	Accounts Elect. Eng. Civil Eng. Recess Process Work. Process Work.

N. B. 1.—The 3rd Year Project commences immediately after the half-yearly Examinations and continues until the 15th May.

N. B. 2.—The 1st Year after the Final Examination will attend for Drawing on Mondays, Wednesdays and Fridays in their class rooms, and on Tuesdays, Thursdays and Saturdays in the Workshops.

† Time-table after Project

\* Time-table after the Final Examination.

A—Odd Nos.

B—Even Nos.

\* Transferred to Civil Engineering Department from 1st April.





## Group I.—DEPARTMENT OF CIVIL ENGINEERING.

### BUILDING MATERIALS.\*

*(1st Year, 2nd half session).*

**Stone.**—Selection. Characteristics. Indian and European stones. Quarrying. Blasting. Dressing stone. Implements.

**Bricks and Tiles.**—Classes of bricks and their distinguishing qualities. Moulding. Drying and stacking. Brick-burning. Types of Kiln. Firebricks. Terra-cotta. Tile manufacture.

**Cements, Limes and Mortars.**—Use of mortar. Natural and artificial cements. Varieties of limes. Hydraulicity. Burning. Clamps. Kilns. Plaster. Whitewash. Distemper. Concrete. Portland cement.

**Timber.**—Growth of trees. Felling trees. Classification and properties of Indian and other woods. Most suitable woods for particular purposes

### CARPENTRY.\*

*(1st Year, 2nd half session).*

Elementary carpentry as applied to Civil Engineering.

### MASONRY.†

*(2nd Year, 1st half session).*

**Stone Masonry.**—Ashlar of various sorts. Block-in-course. Bond. Dressing stone. Rubble masonry. Safe loads. Lewis. Dowel. Joggle. Cramp. Template. Scaffolding. Shears. Derrick. Gyn. Gantry.

**Brick Masonry.**—Types and their uses. Bond. Closers. Bedding. Moisture. Scaffolding. Precautions against settlement. Racking Back. Plastering. Pointing. Coping. Cornice. Blocking Course. Parapet. Eaves Course. Corbel. Lintel. Jamp. Reveal. Sill. Footing. Drip Course. Pise walling. *Dhajji* walling. Hollow masonry. Reinforced brick-work.

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\* Included in the paper on Elementary Engineering.

† Included in the paper on Descriptive Engineering.

**Miscellaneous.**—Retaining walls. Depth of foundations. Counterforts and buttresses. Revetments. Construction and sinking of masonry wells. Simple masonry dams. Technical names of various parts.

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### **EARTHWORK. \***

*(2nd Year, 1st half session).*

Definitions. Contracts. Stability and properties of soils. Measurement and Setting-out. Instruments used. Section and Volumes, Drainage. Puddling. Consolidation. Dressing and turfing. Rates, lift and lead.

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### **FIELD ENGINEERING.**

*(2nd year).*

- (i). **Use of Spars.**—Various knots and lashings and the suitability of each to certain circumstances. Coiling and handling of ropes. Blocks and tackle. Reeving of blocks. Use of handspikes and rollers. Holdfasts. Guys. Use and construction of derricks, shears, gins, and trestles in placing girders or columns in position in building or for other similar work.
- (ii). **Ground Tracing.**—General principles (Masonry Manual). Working plans for foundations on level ground and on slopes. Trenches with vertical and with sloping sides. Laying-out buildings on the ground and similar practical instruction.

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### **THEORY OF STRUCTURES (BUILDINGS). †**

*(2nd Year, 1st half session).*

Consideration of materials used in the construction of Roof trusses. Steel and timber. Determination of stresses in trusses by various methods. Dead loads and wind pressures. Factors of safety and working stresses.

Lectures and exercises on the design of roof trusses. Various types of roof trusses and roof coverings, collar beam and hammer beam trusses.

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\* Included in the paper on Descriptive Engineering.

† Included in the paper on Buildings.

Use of Euler's, Gordon's, Rankine's, Fidler's, Johnson's and straight line formulæ in the design of struts. Buckling Factor of struts; curves showing comparatively strength of struts obtained by various formulæ. Choice of size of sections. Finish of steel work. Joints. Design of end bearings methods of fixing and supporting ends, specifications and estimating.

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*(2nd Year, 2nd half Session).\**

Application of circle and ellipse of stress and Clapyron's theorem to design of structures.

*Cast Iron and Steel columns.*—Flange and web connections to Steel Columns, Caps Bases, Transverse Bracing of Columns.

*Foundations.*—Safe pressures. Foundations for columns. Slab foundations, cantilever foundations, grillage foundations, wells. Piles.

*Retaining Walls and Earth pressures.*—Rankine's theory, Wedge theory, with corrections, Bligh's graphical Construction. Design of various types of Retaining walls in Masonary.

*Tall Masonry and Steel Chimney.*—Theory and Design with reference to a particular example.

*Design of steel and masonry Reservoirs with considerations of wind pressures.*

Fire-proof construction.

Elementary theory of Reinforced Concrete Structures, simple beam, Column and Slab.

Reinforced Brick-work design—Beams, Floors, etc.

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*(3rd Year, 1st half Session).†*

Deflection of framed structures and determination of stresses, etc., in redundant frames.

Influence Diagrams for Bending Moment and shear for uniformly distributed and irregular loads on Trusses, built in beams and three pinned, parabolic, semi-elliptic and semi-circular arches.

General principles of Dome design.

Principles of Building Design. Consideration of loads on buildings. Steel work, Girders, etc., for buildings.

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\* Included in the paper Civil Engineering I.

† Included in the paper Civil Engineering I., Buildings.

Design of a residential bungalow with special reference to selection of site, construction of walls, damp-proof courses, water-supply drainage and ventilation.

Thomson's principles of similar structures as regards their strength, stability, deflections, etc.

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## THEORY OF STRUCTURES (BRIDGES)

*(2nd Year, 2nd half Session).*

**Design.**—Selection of site. Determination of discharge of river by consideration of area of watershed, intensity of rainfall and by zoning. Waterway to be provided. Depth of scour.

Design of foundations. Box, crate, well, pile, continuous masonry or Reinforced concrete slab. Piers, ordinary and abutment. Floors and curtain walls.

Design of superstructure. Determination by graphical and analytical methods of B. M. due to moving loads. Wind pressures.

Design of masonry bridges and culverts.

Plate web girders. Analysis of stresses.

Warren and Lattice girders.

Three-pinned arches, doubly-pinned and rigid arches.

General considerations on the design of suspension, cantilever, and tubular bridges.

Steel arched bridges.

Swing Bridges.

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## REINFORCED CONCRETE.

*(3rd Year, 1st half Session).*

Nature, uses, properties ; advantages and disadvantages of Reinforced Concrete over other types of constructions. Assumptions made in theory of stress in R. C. beams.

Theory and Design of simple beams, T-beams and slabs for different conditions of loading.

Shear, bond, and diagonal tension, and their nature and evaluation ; location of reinforcement.

Theory and design of doubly-reinforced beams, continuous beams, columns piles, Slab Foundations, and Simple Cantilever and Counterfort types of Retaining walls.

Equivalent moments of inertia for R. C. sections.

Theory of Elastic deflections and outline of investigation of stresses in Reinforced Concrete Arches.

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### ESTIMATING.

*(2nd Year, 2nd half Session).*

Rules for taking out quantities in earthwork, masonry flooring, wood work, mouldings, arches, groyned roofs, domes, steel work, and plumbers work.

Calculation of probable quantities of materials required to be furnished for the completion of work.

Common rates and their analysis.

Rates for carriage of material by different means of transport.

Specifications, contracts, and contract law.

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*(3rd Year, 1st half Session).*

Detailed Estimates of some of the designs carried out by the students in the Civil Engineering Design Course.

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### HYDRAULICS (ENGINEERING).

*(2nd Year, 2nd half Session).*

#### **Irrigation and Power.**

General theory of the flow of water. Stream line motion. Bernouilli's theorem and its application to the venturi meter. Flow of water in open channels. Chezy, Bazin, Manning and Kutter formulæ. Application to design of canals and distributaries. Silt transportation formulæ and their application to design of regime channels. Theory of scour as applied to rivers. Flow of water through siphons. Falls free and drowned. Notches on falls. Water cushions. Afflux and back water curves.

Methods of gauging discharges. Modules and semi-modules. Hydraulics and hydrostatics of weirs and dams. Standing waves. Flood absorption formulæ.

Utilization of water as a source of power. Mills. Hydraulomats. Hydraulics of power plants from source to delivery to turbine.

#### **Water-Supply.**

Rational and empirical formulæ for the flow of water through pipes. Limiting, mean and critical velocities. Distribution of velocity in pipes and relation between diameter and discharge. Economical diameter of

pipe lines. Initiation and stoppage of motion in a pipe. Water hammer. Hydraulic gradient. Losses on straight pipes and at bends, elbows and tees. Time of discharge through long pipe lines, branch mains and multiple supply. Flow through bye-pass and pipes coupled in parallel. Flow through terminal nozzles. Meters, siphons, Pitot tubes, Pitometers, pumps and rams. Calculation of compensation water.

## **GENERAL CIVIL ENGINEERING.\***

*(2nd Year, 2nd half Session).*

### **Irrigation.**

Definition of irrigation. Conditions necessitating its introduction. Principal Indian crops, their seasons, and benefits derived from irrigation. Depth of water required to ensure maturity. Cultivated and irrigated areas of India.

Well as a source of irrigation. Lined and unlined wells. Sub-soil water reservoir. Duty of wells. Area irrigable from a well.

Canals as a source of irrigation. Perennial canals. Duty of canal water. Depths and running days. Supplies utilised and lost. Silt and its effect on irrigation channels: its prevention. Kennedy channels. Design of channels from Garrett's diagrams.

Evaporation absorption and percolation. Rise in the sub-soil water level. Water logging. Lining of canals.

Special features of inundation canals. When necessitated. General description, location of off-take to avoid silting.

### **Water-Supply.**

Sources of supply. Springs, wells, rivers and lakes. Selection of a suitable source. Special features of tube-wells. Reservoirs. Impounding storage and service reservoirs. Water towers.

Waterwork. Intakes, settling tanks, filters, rates of filtration, various types of mechanical filtration.

Pipes. Rising mains, expansion joints, losses in head, valves, service tanks, house connection meters, cisterns, etc.

Pumping installations. General types of pumping installations used in India.

### **Roads.**

Formation and permanent way. Types of roadways. Hill roads. Ruling gradients. Resistance of vehicles. Drainage. Tramways and motor transport.

**Railways.**

Formation permanent way and gauges. Tractive force. Super-elevation. Light railways. Mountain railways. Tunneling.

**Miscellaneous.**

Piles and pile driving. Sheet, screw, and interlocking piling.

Diving operations, reclamations, and dredging.

**IRRIGATION.**

*(3rd Year, 1st half Session).*

**Perennial Canals.**—Sources of supply. River discharges. General description of Indian rivers. Location and Design of Headworks in boulder, trough and delta stages of a river. Hydraulics and Hydrostatics of Headworks. Weirs and Undersluices. Head Regulators. Supply Channels. Afflux Bunds. Temporary Diversion Bunds. Permanent Weirs. Various types of same. Drop Shutters. Automatic gates. Stoney Sluice Gates.

**Design and Alignment of Canals.**—Attainment of Water shed. Falls. Bridges. Regulators. Locks. Escapes. Roads. Distributories and Minors. Their design and running. Outlets.

**Cross Drainage Works.**—Maximum rate of run-off from Catchments. Inlets. Super-passages. Level Crossings. Aqueducts. Syphons. Reservoirs.

**Tanks and Reservoirs.**—Tanks. Flank Escapes. Outlet Sluices. Total run-off from catchments. Reservoirs for storage of water. Earthen Dams. Masonry Dams. Theory of their stability and design. Open Weirs. Dams with discharge sluices. Syphon dams. Escapes. Flood absorptive capacity of reservoirs.

**Rivers Training Works.**—Spurs. Groynes. Bell Bunds. Stream line Bunds. Mattresses. Aprons.

**SANITARY ENGINEERING.**

*(3rd Year).*

Two lectures and one tutorial period a week during the 1st half session.

Sanitary laws, refuse removal and disposal, the chemistry of sewage; House Sanitation.

Selection of Sites for house building, house drainage, traps; Sewerage Systems, Sewers, their design and Construction.

Principles of Design and Construction of Sewage Disposal Works.



Incinerators and absorption pits ; trenching.

River Pollution and its effects.

Irrigation and Sewage Farms ; Details of Septic and other types of tanks, contact beds and Activated Sludge System of Sewage Disposal, Filters and Filtration ; Distributors and Sprinklers.

## CIVIL ENGINEERING DESIGN.

(2nd\* and 3rd† Years).

This course is intended to supplement the lectures in Theory of Structures (Buildings and Bridges), General Engineering, Irrigation and Reinforced Concrete. The student will be required to design a number of structures under professional supervision and guidance.

The course will include the design of masonry buildings, masonry and steel bridges, reinforced concrete bridges and buildings, retaining walls, masonry dams and aqueducts.

## PROCESS WORK.

(3rd Year).

**Apparatus.**—General description of materials required, where these may be procured, approximate estimate of their cost.

**Working Room.**—How an ordinary room may be made suitable for Ferrottype work.

**Paper.**—Qualities desirable in paper.

**Tracings.**—Tracing cloth and tracing paper. Essential points to be observed in the preparation and preservation of tracings. Suitable inks. Effects of colour washes on resulting Ferrottype prints.

**Chemicals.**—Chemicals required, with formulæ for mixing. Precautions to be observed in storing.

**Printing.**—Explanation of the action of light on iron salts. The Ferro-prussiate and Ferro-gallic printing processes. How paper negatives may be made with silver salts from which positive prints, ferro-prussiate or silver may be made.

\* 2nd half session. Included in Civil Engineering Design under Practical and Class Work.

† 1st half session. Design under Practical and Class Work.

2nd half session. Included in Project.

Developing, intensifying, reducing, trimming and removal of defects. Methods of making additions of lines, figures, etc., by chemical or other means.

**Practical Course.**—A tracing to be prepared specially for reproduction work by each student. Three copies of Ferro-gallic and three copies of Ferrottype, from the tracing, to be submitted on papers which are sensitised and of which all the manipulations are to be carried out by the student himself. Three copies in each of the above-named processes to be submitted, prepared from commercial ready-sensitised papers, all other manipulations being carried out by the student.

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## ACCOUNTS.

*(2nd half, 3rd Year Session).*

Explanation of the ordinary terms used in book-keeping as they arise during the course. Description and uses of the following :—

Cash book ; petty cash and imprest ; invoice or purchases book ; stock book ; day or sales book : bills book ; the ledger ; single and double entry ; the journal ; balancing the ledger ; simple balance sheets.

Students will work out examples after the necessary explanations have been given.

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## Group II.—DEPARTMENT OF PURE AND APPLIED MATHEMATICS.

### GENERAL MATHEMATICS.

(Including Arithmetic, Algebra, Geometry, Trigonometry and Mensuration).

No lectures will be provided in these subjects which are included in the syllabus of the Entrance Examination. But students will be examined on that syllabus supplemented by the following :—

Theory and Practice of the Slide Rule.

### MATHEMATICS.\*

(*1st Year*).

During the first half session, two lectures and three tutorial periods weekly; during second half session, two lectures and two tutorial periods weekly.

### ANALYTICAL GEOMETRY.

No lectures will be provided for the portion of the subject included in the syllabus of the Entrance Examination. But students will be examined on that syllabus supplemented by the following course :—

(a). **Plane Geometry.**—The straight Line Law. Elementary treatment of hyperbola, logarithmic curve, circular curves, cycloid, epicycloid, witch of Agnesi and cissoid. Further properties of the conic sections and the reduction of the general equation of the second degree.

(b). **Solid Geometry.**—Representation of a point. Direction cosines, etc. Geometry of the Plane and the Straight line, Surfaces of revolution and Notions of Developable surfaces. Elementary treatment of sphere, right circular cone and cylinder, ellipsoid, paraboloid and hyperboloid of one sheet.

### DIFFERENTIAL CALCULUS.

Infinitesimals and limits, definition of function, continuous functions, their properties and geometrical representation. (Graphs of elementary and some simple function). Limiting value of a function; special limiting values.

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\* Stress is laid on graphical Methods.

Derived functions. Geometrical and Physical illustrations. Standard forms, rules for differentiation, inverse circular functions and their derivatives. Successive differentiation. Applications of a derivative. Differentials and application to correction of small errors, Sign of the derivative. Mean value Theorem, etc. Maxima and Minima values of a function of a single variable.

Geometrical applications of the derivative :—

Tangents and Normals. Polar co-ordinates. Points of inflection. Curvature. Curve tracing.

### INTEGRAL CALCULUS.

**Integration.**—As inverse of differentiation. Standard forms. Rules for integration. Integration by substitution and integration by parts. Integration by reduction.

Integration as the limit of a sum :—

Problem of areas, connection with inverse differentiation. Definite Integrals and their properties. Simple cases of double integrals.

**Applications.**—Quadrature and Rectification of curves. Surfaces and volumes of solids of revolution. Centres of Gravity. Theorem of Pappus and Guldinus. Moments of Inertia.

(2nd Year).

During the first half session, one lecture and two tutorial periods weekly ; during second half session, one period weekly.

**Further applications :—**

- (a). Partial differentiation. Differentiation of implicit functions. Total differentiation and application to small errors.
- (b). Planimetric applications. Intrinsic equation of a Curve. Catenary Problems. Theory of transition curves. Approximate integration and Simpson's rule.

**Differential Equations.**—Formation. Equations of the first order and first degree. Special cases. Integrating factor, Linear differential equations of the first order with constant co-efficients ; Clairaut's form.

Geometrical, Physical and Engineering problems including Vibrations, etc. Linear equations with constant co-efficients. Particular integrals and their determination in simple cases. Expansion of functions by Taylor's and Maclaurin's series and by differential equations. Applications to Maxima and Minima. Elementary Fourier's Series.

**MECHANICS.**

No lectures will be provided for the portion of the subject included in the Syllabus of the Entrance Examinations. But students will be examined on that syllabus supplemented by the following course.

*(1st Year).*

During the first half session, two periods in the laboratory, and one lecture and one tutorial period weekly; during second half session, one lecture and one tutorial period weekly.

(a). **Graphic Statics.**—Representation and Composition, etc., of forces. Funicular polygon and its applications; conditions of equilibrium. Graphical determination of stresses in frames. Effect of wind loads. Method of sections. Displacement diagrams.

(b). **Dynamics.**—Relative velocity, tangential and normal accelerations. D'Alemberts Principle. Angular momentum and related problems, motion about a fixed axis. Compound Pendulum.

(c). **Hydrostatics.**—(with introduction to Hydraulics). Fluid pressure on surfaces in contact. Centre of Pressure. Laws of floatation and Metacentre. Simple Machines depending on fluid pressure and elementary notions about fluids in motion leading up to Bernoulli's Theorem.

(d). **Mechanical Laboratory.**—The majority of the experiments here will be made by the students themselves in accordance with written instructions issued to them. The objects of such experiments will be as follows:—To accustom the students to the use of accurate measuring instruments; to illustrate the principles of elementary mechanics; to verify the laws of motion, impact, friction and proportionality of stress and strain; to determine elastic constants for different materials, moments of inertia, centres of gravity, co-efficients of velocity, contraction and discharge for different orifices in hydraulics; to illustrate the use of section paper in plotting experimental results for the reduction of empirical formulæ

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**APPLIED MECHANICS.**

*(1st Year).*

During the whole session one lecture and one tutorial period weekly.

I. **Theory of structures.**—Analysis of stress and strain. Relation between elastic constants. Torsion of circular shafts. Combined

torsion and longitudinal stresses. Working stresses in a structural member and determination of its dimensions. Elastic limit and ultimate strength. Stresses due to repetition of applied loads and due to dynamically applied loads. Bending moment and shearing force diagrams for beams and cantilevers due to dead loads only; relation between B.M. and S.F. diagrams. Theory of bending of beams, fibre stresses, modulus of section, moment of resistance, distribution of shear stress and principal stresses in a beam.

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II\*. Analysis of Compound and conjugate stresses. Rankine's theory of earth pressure, depth of foundations and strength of footings. Coulomb's theory of earth pressure; modification due to Rebahnn. Application of the principle of virtual work to deflections in framed structures and to finding stresses in frames with one redundant member.

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**Hydraulics.**—Hydro-kinetics, uniform and steady flow, stream line and turbulent motion. Bernoulli's theorem and its application.

(2nd Year).

During the first half session, three lectures and three tutorial periods weekly; during the second half session one lecture weekly, and two tutorial periods weekly till middle of April.

**Theory of structures.**—Bending moment and shearing force diagram for live loads. Analysis of uniform and uniformly varying stress. Stresses due to eccentric loads. Stresses in chimney and masonry dams. Line of resistance. Stability of blockwork structures. Stresses in riveted joints and in boiler shells. Bending in columns due to direct and eccentric loads. Rankine's, Gordon's and other formulæ. Deflections of simply supported, fixed and continuous beams. Theorem of three moments. Flexible chains. Theory of elastic arches. Masonry arches.

**Hydraulics.**—Discharge through orifices and mouth-pieces, and over notches and weirs. Flood absorption. Discharge when the head varies. Laws of fluid friction. Heads lost due to friction, sudden enlargement and contraction and other causes. Flow through pipes and channels. Chezy's and other formulæ for velocity of flow. Channel cross-sections of greatest efficiency.

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\* Treated graphically.

## Group III.—DEPARTMENT OF SURVEY AND DRAWING.

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### SURVEY.

*(1st Year, 1st Session).*

Construction of Scales. Conventional signs. Use and adjustment of instruments, *vide* Survey Manual Part I. Theory of levelling, simple, compound, check and reciprocal levelling. Various causes of errors in levelling. Elimination of such errors. Customary limits of error. Level drill in the field. Method of keeping various style of field-books. Use of boning rods. Chain survey. Chain and compass survey.

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*(2nd Year, 1st Session).*

Theodolite traversing by Gale's traverse system for city and town improvement surveys. Sources of errors and required precision in traversing. Traverse tables. Theory and use of the simple plane-table and tangent clinometer. Theory and use of the stadia method of plane-tabling with levelled heights and reductions of distances and heights by slide rule. The three-point problem or plane-tabling by resection from within and without the triangle. Geometrical and trigonometrical proof of the three-point problem. The two-point problem with and without the magnetic compass. Triangulation with reciprocal value heights of stations, base line measurements. Finding values of position by observations to three known points. Computation by rectangular co-ordinates with convergency correction.

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\* For periods see time-tables pages 8 and 9.

Contouring of the triangulated area by heights calculated from the reduced levels. Longitudinal and cross sections run with a Level. The location on the map of a road, railway, canal or weir, etc. The general principles of tunnel alignment and of carrying surface meridians underground for mine surveys. Discussion on the latest patterns of instruments.

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## **PRACTICAL ASTRONOMY.**

*(2nd Year, 2nd Session and 3rd Year, 1st Session).*

Introduction to Spherical Trigonometry up to the solution of the spherical triangle and the adaptation of Napier's rules of circular parts. Definitions, systems of celestial co-ordinates, the reasons for sidereal, sun and mean time, acceleration, retardation and equation of time. The Julian and Gregorian calendars, time and the various astronomical corrections.

The practical course consists in finding the meridian of a place by observations to the sun or a star at upper culmination, by equal altitudes, by the sun or stars not on the meridian, and by circumpolar stars at elongation; and in finding time by the sun or stars on the meridian and *ex-meridian*; and in finding latitude by Polaris and circummeridional observations. Use and construction of Sundials.

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## **CURVES AND ALIGNMENTS.**

*(2nd Year, 2nd Session and 3rd Year, 1st Session).*

Theory of curves. Curves laid out with the aid of angular instruments. Curves laid out by linear measurement only. By chords and offsets (several methods). By offsets inside the curve. Curve by ordinates from the long chord. Curve with certain given data to pass through a ruling point. Compound curves. Diversion curve. Vertical curves. Curve spir or Transition curve. Double centre method for laying-out a straight line. Setting out pegs for earthwork. Computation of areas of cross sections, etc.



**HYDRO-ELECTRIC SURVEYS.**

*(3rd Year, 1st Session).*

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Topographical maps, how to study and read them, areas suitable for water power schemes, preliminary reconnaissance, catchment areas, rainfall and run off. Barlow's percentages, approx: discharges of streams and rivers, capacity of water impounded. hydrographical methods of survey, pipe line alignment, tunnel alignment, forebay, transmission line survey. Instruments used on reconnaissance, preliminary survey and final contour survey.

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**DRAWING.**

*(1st Year, 1st and 2nd Sessions).*

The following course has been formulated to carry the student step by step in the *technique* of drawing as a preparation for a course in Engineering Design and Survey Mapping.

Architectural colouring. Projection of Solids. Planes and Lines. Contour location plan. Isometric projection. Intersection and Development of Solids. Perspective. Survey plan. Drawing of simple masonry structures. Railway or road plan and section. Sketches of models, etc. Building, plans, elevations, sections of Building from measurement.

*Note.*—All drawing plates must be done in College during drawing attendances and they must have the date of commencement and completion, with the student's name and order of standing in the class.

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## Group IV.—DEPARTMENT OF APPLIED SCIENCE.

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### INORGANIC CHEMISTRY.

*(1st Year).*

Two lectures weekly throughout the session.

The course will comprise a general discussion of the properties of the elements and their more important compounds from the standpoint of the Periodic Law, and will include a systematic study of the metals and non-metals. The following topics will also be dealt with :—nature of physical and chemical change; combustion; chemical affinity; the laws of chemical combination; the atomic theory; the gas laws and the kinetic theory of gases; vapour density; specific heat; chemical equivalents; atomic and molecular weights; Valency; chemical equations; calculations of quantities by weight and by volume; mass action; isomorphism; solution; diffusion; dissociation; the properties of colloids; electrolysis.

The syllabus is specially arranged to prepare engineering students for the 2nd year course which treats of the application of chemistry to engineering practice, and, in particular, with the properties and characteristics of engineering materials.

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**PRACTICAL CHEMISTRY.***(1st Year).*

Two afternoons a week during the first half session, and one afternoon a week during the second half session.

The practical work in the chemical laboratory will cover the general principles of qualitative analysis and elementary quantitative analysis. The professional engineer is not expected to be able to carry out the chemical analyses he requires, but he should be able to understand and able also to interpret intelligently the reports received from a professional analytical chemist. The practical course in chemistry has, therefore, been drawn up with this object in view.

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**APPLIED CHEMISTRY.***(2nd Year).*

One lecture a week during the 1st half session.

The manufacture of iron and steel. Comprising a discussion of the following :—

Metallurgical terms; ores; fuel; refractory materials; furnaces; furnace temperatures; the production of pig-iron and wrought-iron; a brief description of the more important methods of steel manufacture; the chemical composition of pig-iron, wrought-iron and steel; the effect of impurities; corrosion; and protection of iron steel; a short description of the properties of the rarer metals employed in the production of certain kinds of steel; steel alloys, cooling curves; metallography.

The properties and composition of the remaining common alloys, *e.g.*, gun-metal, phosphor-bronze, brass, solder, etc.

Decay in timber : methods used for preventing decay.

Quicklime, hydraulic lime, cements, their chemical composition and preparation; the setting and hardening of mortar and cements.

Paints; and varnishes preparation and use of the common pigments,

etc. Preparation of glass, soluble glass, porcelain, pottery and bricks;

Natural waters, their chemical composition, analysis, bacteriological examination and suitability for various purposes. Preservation of structural materials.

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## PHYSICS.

(1st Year).

Two lectures and two practical periods, a week, during the whole session.

1. **General.**—Commercial and some special methods of measuring density. Transmission of pressure in fluids and its application to hydraulic press and transmission of power for industrial purposes.

Aneroid and Fortin barometer with their characteristic errors and uses. Pressure and vacuum pumps; monometers and pressure gauges.

Hooke's law and its applications.

2. **Heat.**—High and low temperature measurement. Practical applications of the expansion of solids, liquids and gases by heat. Absolute zero.

Vapour pressure. Methods of measuring storage pressure; flash point. Determination of height by hypsometer. Total heat of steam; superheated steam; methods of measuring dryness of steam.

Heat transmission; methods of measuring heat-insulating properties of non-conductors. Ventilation of buildings. Newton's and Stefan's laws of cooling. Determination of loss of heat from a surface by radiation.

Elementary discussion of the principles of thermo-dynamics; Ideal heat engine cycles; principles of refrigeration; entropy. Calorific value of fuels.

3. **Light.**—Optical properties and applications of parabolic and cylindrical mirrors, cylindrical and prismatic lenses and totally reflecting prisms.

**Spherical and chromatic aberration ; defects in images due to these and methods of minimising the defects.**

**Dispersion and spectrum analysis.**

**Simple optical instruments.**—Sextant, telescope, microscope, range-finders ; eye-pieces. Huyghen, Ramsden and terrestrial.

**Photometry and modern forms of photometers.**

**Polarisation with simple applications.**

**4. Sound.**—Acoustic properties of buildings and prevention of echoes. Elementary discussion of vibrations.

**5. Electricity and Magnetism.**—Electrostatic unit of quantity. Potential, capacity, condenser, energy of a condenser, Quadrant electrometer.

**Production and propagation of electric waves. Principles of wireless transmission and reception. Description of a wireless receiving set.**

**Measurement of P.D., current and resistance by potentiometer. Back e.m.f. in electrolysis. Secondary cells.**

**Electrical, mechanical and heat units of energy.**

**Electro-magnetism and instruments.**

**Electro-magnetic induction.**

**Magnetisation ; permeability and its measurement ; hysteresis.**

*Note.*—A comprehensive course of practical work will be carried out by each student during the laboratory periods.

## **MINERALOGY AND GEOLOGY.**

*(2nd Year).*

**Two lectures and one practical period a week during the 2nd half session.**

**Mineralogy.**—Crystal form and symmetry ; division into systems ; their principal characteristics ; classification based upon (a) chemical composition, (b) physical properties, *e.g.*, specific gravity, hardness, cleavage, fracture, phenomena relating to light ; simple description and identification of rock-forming minerals, ores, veinstones, salts and gems.

**Geology.**—Elementary discussion of the geological agents, their influence in effecting geological changes, and the records left by them. Simple description of the principles of structural geology; sedimentary and igneous rock; use of fossils; elementary discussion of the general principles of historical geology, including a brief description of the geological record of the history of the Earth with a short discussion of the chief characteristics of the following divisions :—

- |                   |  |              |
|-------------------|--|--------------|
| 1. Archæan.       |  | 3. Mesozoic. |
| 2. Palæozoic.     |  | 4. Tertiary. |
| 5. Post Tertiary. |  |              |

A short description of the stratigraphical geology of India.

**Practical Course.**—The object of the practical work is to enable the student to identify the more common ores, salts, and rock-forming materials by the application of simple, physical and chemical tests.

## Group V.—DEPARTMENT OF MECHANICAL AND ELECTRICAL ENGINEERING.

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### DESCRIPTIVE ENGINEERING.

(1st Year).

One lecture and one tutorial a week during the 1st half session.

One lecture a week during 2nd half session.

**Boilers.**—Cornish, Lancashire, locomotive, vertical, and water-tube boilers. Boiler details. Safety valves, check valves, feed pumps. Superheaters. Feed-water heaters. Oil separators. Boiler room instruments.

**Engines.**—Modern, High and Low-speed steam engines. Types of Gas and Oil engines. Steam Turbines. Engine details.

General arrangement of Power-house Auxiliary Machinery.

**Hydraulics.**—Plunger, centrifugal and turbine pumps.

Pelton wheel, inward and outward flow turbines.

**Machine Tools.**—General description of lathes, drilling, shaping and milling machines.

Arrangement of shafting and belting in a machine shop.

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### THEORY OF MACHINES.

One lecture a week during 2nd half session.

**Kinematics.**—Kinematic chains. Relative motion. Point paths. Angular velocity. Instantaneous centre.

Transmission of motion by belts. Speed cones. Fast and loose pulleys. Belt-driving between non-parallel shafts.

Friction rollers and toothed wheels. Pitch surfaces and lines. Kinematic conditions to be satisfied by profiles of teeth. Involute and cycloidal teeth. Trains of wheels. Epicyclic trains. Reversing mechanisms using toothed wheels.

**Workshop Course.**—Two attendances per week throughout first year. Practical work in Carpenter's, Fitting and Machine Shops.

(2nd Year).

One lecture a week throughout the session.

Conversion of reciprocating into rotary motion. The slider crank chain. Mechanism of a shaping machine. Quick-return motion.

Friction. Laws of friction as depending on velocity and pressure. Friction of greased surfaces. Friction of belts on pulleys. Transmission of power by belts and ropes. Slipper and band brakes. Dynamometers.

**Dynamics of Reciprocating Engines.**—Piston acceleration and velocity diagrams. Angular velocity of connecting rod. Forces due of inertia of reciprocating parts. Crank effort diagram. Fluctuation of energy. Function of fly-wheels. Function of a governor. Simple pendulum and loaded governors. Effect of friction on governors. Governor effect and power.

**Valve Gears.**—Simple slide valve. Valve diagrams. Independent cut-off gears. Reversing gears and link motions. Radial gears. Piston valves. Corliss and other trip gears.

Elementary treatment of balancing problems.

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## BEHAVIOUR OF MATERIALS UNDER STRESS.

One lecture a week throughout 2nd term.

Elastic limit and Yield Point. Ductile strains. Ultimate strength. Measure of ductility. Effect of shape of test pieces. Resilience. Effect of overstrain on Elastic limit. Hardening and annealing. Compression test. Live loads. Resistance to shock. Fluctuating stresses. Fatigue and effect of dynamic loading. Factor of safety. Combined stresses. Hardness tests.

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## HEAT ENGINES.

One lecture a week throughout the session.

Elementary Thermo-dynamics. Work done by an expanding fluid. Adiabatic and isothermal expansion and compression. Entropy.

Air compressors and motors.

Ideal Heat engines. Thermal Efficiency.

Carnot constant volume and constant pressure cycles.

Combustion. Evaporation. Laws of heat transmission.



Station boilers. Gas producers.

Steam engines. Action of steam in cylinder. Effect of initial pressure and expansion on economy. Governing. Steam jacketing and super-heating.

**Internal Combustion Engines.**—Principles of working. Effect of compression. Strength of mixture, speed, point of ignition. Description of gas and oil engines.

**Refrigerating Machinery.**—Principles of working. Choice of working substance. Comparison of results from different machines.

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*(3rd Year).*

One lecture per week for first half session.

Flow of steam through orifices and nozzles. Impact of steam on vanes.

Classification of steam turbines. Determination of vane angles.

Steam consumption. Effect of vacuum, super-heat, initial pressure.

Governing of steam turbines.

**Hydraulic Machinery.**—Revision of Hydraulics and Hydrostatics. Impact of water on fixed and moving vanes. Turbines—Impulse and Reaction. Description of different types of turbines. Determination of vane angles. Efficiencies of turbine plant. Governing.

Pumps—Reciprocating Centrifugal and Turbine.

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## MECHANICAL ENGINEERING DESIGN.

*(1st and 2nd Years).*

An Elementary course in Engineering Design.

Design of bolts, cotters, riveted joints. Shafting, coupling and bearings. Pulleys, Spur and Bevel gearing. Profiles of teeth. Cam profiles.

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## ENGINEERING LABORATORY.

*Two hours per week throughout (2nd year and 1st term of 3rd year).*

**Material Testing.**—Tests to destruction of specimens of cast-iron, wrought iron, steel and various alloys in tension, compression, bending and torsion. Elastic tests of various materials. Microscopic examination of metals. Effect of heat treatment. Riveted joints. Shafts and couplings. Tests of cements, concrete bricks, and stones.

**Thermo-Dynamic Laboratory.**—Determination of latent heat of steam. Calorific values of liquid, solid, and gaseous fuels. Use of Indicator. Tests of steam and internal combustion engines, steam turbines, boilers and condensers. Gas analysis.

**Hydraulic Laboratory.**—Flow of water through orifices and nozzles. Flow over weirs. Flow through pipes. Effect of bends, elbows, changes of section of pipe.

Testing of turbines and centrifugal pumps.

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## ELECTRICAL ENGINEERING.

(2nd Year).

Two lectures and two practical periods, each week throughout the second year.

**General.**—Electric and Magnetic Circuits, conductivity and insulation of materials : measuring instruments : direct current : principle of alternating currents in single, two and three phase circuits.

**Dynamo Electric Machinery.**—Description ; principles ; working and maintenance ; characteristics of D. C. and A. C. generators and motors including parallel working. The course will deal with :—

- (a). Series, shunt and compound-wound D. C. generators : prevention of sparking : voltage regulation and the use of inter poles.
- (b). Series and shunt wound D. C. motors : their starting, speed control and efficiency.
- (c). Single and three-phase A. C. generators ; parallel working.
- (d). Induction, synchronous and slip-ring motors : methods of starting, working and characteristics.

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(3rd Year).

Two lectures a week and three lectures a week after Civil Engineering project.

**General.**—The course treats of the transmission and distribution of electrical energy and the following points will be considered in detail :—

- (a) transmission of energy : high and low tension systems : advantages of the 3-phase system : voltage drop, and power factor : posts and insulators, and erection of mains : underground and overhead systems contrasted.

- (b) distribution of electrical energy: arrangement for a public supply and the use of feeders.
  - (c) transformers: construction, action, working and efficiency: rotary converters and motor generators.
  - (d) rectification: mercury and valve rectifiers.
  - (e) switch gear as applied in modern power stations: protection, boosters, balancers and accumulators.
  - (f) lighting: systems of wiring accessories distribution, and fuse boards: wiring circuits: wiring rules: incandescent lamp and heating appliances: estimating: a small project will be included in the course.
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*Note.*—A comprehensive course of practical work will be undertaken during the laboratory periods.

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# COURSE OF STUDY AND SYLLABUS.

## OVERSEER CLASS, 1929-30.

\*THE chief points kept in view in arranging this Course of Study are to ensure the necessity for steady work throughout the whole course, and to co-ordinate the instruction given in each subject so as to lead up to a thorough test of the qualifications necessary for a Subordinate Engineer in the Public Works Department of as high a grade as a College training can produce; special attention being paid to the local conditions of India. This test is represented by the Project and the Final Examinations. 50% marks gained in the first year are carried on to the second year, so that continuous steady work is necessary for ultimate success.

### *Terms and Examinations.*

#### **FIRST TERM—**

College Attendances—From October 16th to a variable date in February.

Examinations— Start on the 1st or 2nd Monday in February, whichever falls nearest to the 7th of February.

#### **SECOND TERM—**

College Attendances—Start on the Monday following the half Sessional Examinations and continue till about June 10th.

Project— 1st May to about 3rd or 4th of June.

Revision in quarters—About June 10th to about June 17th.

Examinations— About June 18th.

ATTENDANCES— These are shown in the Time-Tables on pages 126 and 127.

The Course of Study extends over two years, and comprises the following subjects grouped under seven heads, to which the following numerical values are assigned:—

		<i>Marks.</i>
Group	I—Civil Engineering ...	1,600
„	II—Pure and Applied Mathematics ...	750
„	III—Surveying ...	550
„	IV—Drawing ...	375
„	V—Mechanical Engineering ...	375
„	VI—General ...	350
„	VII—Project ...	300
„	VIII—Physique ...	400
Total		4,700

The marks required at the end of the second year for certificates are as follows:—

I.—To obtain the Higher Certificate as Overseer the minimum pass marks of 50 per cent. in each group and 60 per cent. in the total must be earned.

II.—To obtain an ordinary Certificate (required for all Overseers) the minimum pass marks of 33 per cent. in each group and 50 per cent. in the total must be earned.

*To qualify for return to the College at the end of the first year* students are required to obtain 33 per cent. of the marks allotted to each group and 50 per cent. of the total marks.

A Student failing to obtain this standard will not be allowed to return to the College unless his failure was due to prolonged absence through sickness, or other circumstances beyond his control, in which cases the sanction of Government will be required for his re-admission contingent on the recommendation of the Principal.

Photography is a voluntary subject, and the marks obtained in this subject do not count in the total.

The Examinations, the marks assigned to them, and the Time-Tables are shown on the following pages.

**EXAMINATIONS AND MARKS.***(1st Year).***THEORETICAL.**

<i>1st Term.</i>		<i>2nd Term.</i>	
Subjects.	Marks.	Subjects.	Marks.
1. Building Materials	... 100	1. Building Materials, Earthwork and Carpentry	} 100
2. Carpentry	... 100	2. Masonry and Building Construction	
3. Earthwork	... 100		} 100
4. Trigonometry & Geometry	100	3. Elementary Mathematics	
5. Mensuration	... 100	4. Mechanics	... 100
6. Mechanics	... 100	5. Surveying	... 100
		6. Drawing	... 100
		7. Physical Science	... 100
		8. Mechanical Engineering	100
	<hr/> 600 <hr/>		<hr/> 800 <hr/>

**PRACTICAL AND CLASS WORK.**

1. Mathematics, Tutorial *	100	1. Engineering Note-books	100
2. Levels in the Field	... 100	2. Mechanics Tutorial *	... 100
		3. Surveys in Field	... 100
		4. Drawing Course	... 250
		5. Workshops	... 50
	<hr/> 200 <hr/>		<hr/> 600 <hr/>
	<hr/> 800 <hr/>		<hr/> 1400 <hr/>

**TOTALS.**

			Marks.
1st Term	...	...	800
2nd Term	...	...	1400
			<hr/>
	Grand Total	...	2200
			<hr/>
	Carried forward 50%	...	1100
			<hr/>

\* Fortnightly Submissions.

† This will include Arithmetic, Algebra, Geometry, Trigonometry and Mensuration.

**EXAMINATIONS AND MARKS.***(2nd Year).***THEORETICAL.**

<i>1st Term.</i>		<i>2nd Term.</i>	
Subjects.	Marks.	Subjects.	Marks.
1. Roads ...	100	1. Building Construction	100
2. Bridges ...	100	2. Bridges ...	100
3. Estimating ...	100	3. Railways ...	100
4. Accounts ...	100	4. Irrigation ...	100
5. Mechanics and Hydro- statics }	100	5. Sanitary Engineering } and Water Supply }	100
6. Applied Mechanics ...	100	6. Estimating ...	100
7. Elementary Electrical Engineering }	100	7. Process Work ...	50
8. Mechanical Engineering	100	8. Applied Mechanics ...	100
		9. Surveying I. ...	100
		10. Surveying II. ...	100
		11. Drawing ...	100
		12. Mechanical Engineering	100
	<hr/> 800 <hr/>		<hr/> 1150 <hr/>

**PRACTICAL AND CLASS WORK.**

1. Field Engineering ...	100	1. Engineering Note-books	100
2. Applied Mechanics } Tutorial }	100	2. Drawing Course ...	100
3. Survey Course ...	200	3. Process Work ...	50
		4. Civil Engineering } Design }	200
		5. Workshops ...	100
		6. Project ...	300
		7. General Fitness ...	400
	<hr/> 400 <hr/>		<hr/> 1250 <hr/>
	<hr/> 1200 <hr/>		<hr/> 2400 <hr/>

**TOTALS.**

			Marks.
1st Term	...	...	1200
2nd Term	...	...	2400
			<hr/> 3600 <hr/>
		Add First Year's Marks	1100
			<hr/>
		Grand Total	4700
			<hr/>

**GROUP VII.**

The Project will consist of two or more exercises in Civil Engineering Design and Field work.

The total number of marks is 300.

**GROUP VIII.**

*The sub-heads and marks allotted to Group VIII Physique and General Fitness are :—*

Physical Drill—Members of the A. F. I. are not required to pass in Physical Drill and are marked for drill, shooting, etc.	...	100
Athletics—Proficiency in games and sports.	...	150*
General Fitness—Physical and moral fitness for work in the engineering profession	... ..	150
		<hr/>
	Total	... 400
		<hr/>

\* Athletics will be marked for Football, Hockey, Tennis and Athletic Sports and such marks will be awarded by officers in charge of these games. *Any three* will carry the 150 marks.





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TIME-TABLE.

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## TIME-TABLES.

FIRST TERM.							
	Hour.	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	Saturday.
1st Year.	8-9	...	...	Mechanics	...	...	Survey
	9-10	Mathematics	Mechanics	Mechanics	Mathematics	Mathematics	Survey
	10-11	Civil Engrg.	Civil Engrg.	Civil Engrg.	Civil Engrg.	Mathematics	Survey
	11-12	Drawing	Drawing	...	Drawing	Drawing	...
	12-1	Drawing	Drawing	Drawing	Drawing	Drawing	Survey
	1-2	...	...	Drawing	...	...	Survey
	2-3	Workshops	Civil Engrg.	...	Mechl. Engrg.	Civil Engrg.	...
	3-4	Workshops	Civil Engrg.	...	Workshops	Physical Science	...
	4-5	Workshops	...	...	Workshops	...	...
2nd Year.	8-9	Survey	Survey	Mechanics	Survey	Survey	Estimating
	9-10	Survey	Survey	Civil Engrg.	Survey	Survey	Estimating
	10-11	Survey	Survey	Civil Engrg.	Survey	Survey	Mech. Engrg.
	11-12	Survey	Survey	...	Survey	Survey	...
	12-1	Survey	Elect. Engrg.	Civil Engrg.	Elect. Engrg.	Survey	Drawing
	1-2	...	...	Civil Engrg.	...	...	Drawing
	2-3	Drawing	Applied Mech.	...	Applied Mech.	Civil Engrg.	...
	3-4	Drawing	Applied Mech.	...	Civil Engrg.	Workshops	...
	4-5	...	...	...	...	Workshops	...

## SECOND TERM.

	Hour.	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	Saturday.
1st Year.	8-9	Mathematics	Mechanics	Mathematics	Mechanics	Survey	Survey
	9-10	Civil Engrg.	Civil Engrg.	Mathematics	Mechanics	Survey	Survey
	10-11	Civil Engrg.	Physical Science	Mechl. Engrg.	Civil Engrg.	Drawing	Survey
	11-12	...	...	...	...	...	...
	12-1	Workshops	Drawing	Drawing	Civil Engrg.	Drawing	Drawing
	1-2	Workshops	Drawing	Drawing	Civil Engrg.	Drawing	Drawing
	2-3	Workshops	...	...	...	...	...
2nd Year.	8-9	Civil Engrg.	C. E. Design	Estimating	Survey	C. E. Design	Civil Engrg.
	9-10	Mech. Engrg.	C. E. Design	Estimating	Survey	C. E. Design	Civil Engrg.
	10-11	Civil Engrg.	C. E. Design	Applied Mech.	Drawing	C. E. Design	Drawing
	11-12	...	...	...	...	...	...
	12-1	Estimating	Applied Mech.	Applied Mech.	Drawing	Workshops	Drawing
	1-2	Estimating	Civil Engrg.	Applied Mech.	Drawing	Workshops	Drawing
	2-3	...	...	...	...	Workshops	...

*N.B.*—The 2nd Year Project will commence about the 1st May and will continue to the Saturday before the Entrance Examination.

The 1st and 2nd Year Drawing Courses will be submitted on the Saturday previous to the Entrance Examinations in June, and the 1st Year will take up accounts after the Final Examinations, afternoon periods only.

Lectures in Electrical Engineering and Ferrotyping and Process Work will be taken up after the Final Examinations in the 2nd Term of the 1st year morning periods only. 3 morning periods Electrical Engineering and four morning periods Ferrotyping.



## SYLLABUS.

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### GROUP I.—CIVIL ENGINEERING.

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#### Building Materials.

(1st Year).

*Stone*.—Selection. Characteristics. Classification and appearance. Position in quarry. Composition and stratification. Table of useful Indian stones and the purposes for which they are best qualified. Preservation. Artificial stones. Arrangements for quarrying. Blasting. Implements used. Line of least resistance. Size and position of charges. Fuze. Large blast. Method of boring and firing blast holes. Dressing stones.

*Bricks*.—Classification and names of various bricks and their qualities. Tests for bricks. Brick-earth. Qualities to be sought for. "Reh" in bricks. Preparation of clay for bricks. Sizes of bricks. Moulding. Hand moulding, slop moulding, sand moulding, ground moulding, block moulding. Economy in moulds. Rate of moulding. Arrangement of workmen for moulding. Drying. Stacking. Burning bricks. Clamps. Time of burning. Pazawahs. Kilns of various sorts. Their comparative advantages. General principles of burning. Rates. Bull's kiln. Fire bricks.

*Tiles*.—Selection and preparation of clay. Methods of making *e.g.*, Potter's wheel, Squirting and Moulding. Burning. Arrangement in kilns. Allahabad tiles. Mangalore tiles. Glazed tiles. Glass tiles.

*Cements Limes, Mortars*.—Use of mortar. Varieties of lime. Properties of limestone. Burning. Clamps. Kilns. Natural and artificial cements. Portland cement. Classification of limes. Testing strength of mortar. Asphalte. Whitewash. Plaster. Lime concrete. Cement concrete.

**Timber.**—Growth of trees. Felling trees. Seasoning. Decay. Classification. Indian timber in general use, its durability and location, and suitability for different purposes.

**Metals.**—Metals used in engineering. Their appearance and properties. Iron ores. Principles of smelting. Cast-iron. Wrought-iron. Steel. Impurities and their effects. Casting. Puddling. Refining. Annealing. Welding. Tempering. Protection against corrosion. Other metals. Alloys.

**Miscellaneous.**—Paint. Bases. Vehicles. Solvents. Driers. Pigments. Varnish. Wood-oiling. Glass. Putty. Glue. Size. Coal Tar. Creosote. Pitch.

Students will make themselves familiar with the appearance of various sorts of materials, *e.g.*, stone, brick, etc., so that they may be able to classify them at sight. Students will be shown practically how to class bricks, rough test for quality of lime, surkhi, cement, mortar, etc.

**Laboratory work.**—Simple tests of cement, lime, mortars, etc.

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## Carpentry.

(1st Year).

Definition of carpenter's, joiner's and cabinet-maker's work. Method of measuring each class of work. Joints and angle joints. Principles in making joints. Flat roofs. Floors. Built beams. Trussed beams. Protection of timber. Frames. Roof-trusses. Timber partitions. Staircases. Doors and windows. Centering. Staging. Examples.

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## Masonry.

(1st Year).

**Plant and Scaffolding.**—Plant. Machinery. Instruments used in building. Scaffolding.

**Stone Masonry.**—Classification. General principles and precautions. Method of building. Ashlar masonry. Bond. Different kinds of masonry. Methods of strengthening joints. Dowels. Joggles. Cramps. Dressing of stones. Lewis. Bolls machinery for lifting stones.

*Brick Masonry.*—Bricks. General principles and precautions. Settlement. Bond. Racking back. Hollow walls. Reinforced brickwork. Burnt and sundried bricks in mud mortar. Mud walls. Pise walls.

*Archwork.*—Arches. Arch forms. Inverts. Jack arches. Piers for arches. Vaulting. Underground arches, tunnels, culverts. Setting out. Thickness of arches. Centering. Bond of stone and brick arches. Skew arches. Ribbed skew arches.

*Foundations and wells.*—Foundations. Nature of sub-soils. Soil for foundations. Foundations in different localities. Piles and pile-drivers. Wells and well foundations. Excavating apparatus. Well curbs. Foundations in water.

*Types and Construction of retaining walls.*—Depth of foundations. Precautions against water. Counterforts. Revetments. Breast walls. Dry stone retaining walls. General types of masonry dams.

*Concrete.*—Different kinds. Mortar used. Ballast. Sand. Proportions of ingredients. Mixing. Laying and ramming. Thickness of layers. Volume. Rubble concrete. Forms for concrete. Laying concrete under water. Waterproofing. Methods of finishing surfaces. Elementary reinforced concrete. Correct positions for stopping reinforced work.

*Pointing and Plaster.*—Details. Varieties. Polished cement floors.

*Appendices.*—Notes and specifications on different varieties of masonry work.

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## Earthwork.

(1st Year).

*General notes.*—Definitions. Contracts. Stability and angle of repose. Properties of clay. Stratified soils. Preservation of materials obtained in excavation. Hints on management.

*Measurement and Setting-out.*—Side widths and slopes.

*Tools and execution of work.*—Tools and Machinery used. Tools for rock excavation. Supply of tools.

*Cuttings.*—Economical depth. Horse run. Stages.

*Embanking and puddling.*—Embankments. Settlement. Slopes. Protection. Drainage. Puddling. Puddle cores. Sections.

*Maintenance.*—Slips. Drainage and protection of slopes



*Earthwork for Canal Distributaries.*—Object and general design. Economical depth of cutting. Alignment across high ground. Inner slopes. Cross sections. Special banks. Recessing of banks. Puddle linings. Laying out. Land demarcation. Borrow pits. Operations. Bench marks. Profiles. Excavation. Temporary land. Earthwork near masonry works. Method of consolidation. Grassing banks, grazing. Repair works.

*Appendices.*—Notes and specifications.

## Building Construction.

(1st Year).

*Site and design.*—Selection of Site. Design of buildings.

*Foundations.*—Suitability of soils. Benching out. Preparation of bed. Widths for different pressures. Earth filling.

*Walls.*—Plinth. Thickness. Walls in mud mortar. Strutting. Buttresses and pilasters. Bond. Scaffolding. Shoring. Underpinning. Chimneys. Arches. Openings for doors and windows. Wall plates. Recesses for ends of beams. Wooden bricks, plugs and iron hold-fasts. Hollow walls. Partitions. Damp proof courses. Plaster and pointing. Different parts of walls. Columns and piers.

*Staircases.*—Types. Positions. Width of tread and height of rise. Width and headway of staircase. Stairs of different materials. Spiral stairs. Balustrades and hand rails.

*Floors and ceilings.*—Types of floors. Preparation of bed. Floors of different materials. Jack arch floor. Patent fireproof floors. Damp proof floors. Protection from white ants. Ceilings.

*Roofs.*—Types of roofs and their supports. Roofs of different materials. Iron roof supports. Iron trusses. Verandah roofs. Vaults and domes. Roof gutters and spouts. Patent roofing.

*Fittings and decorations.*—Types of fittings. Skylights and lanterns. Shelves and hanging fixtures. Punkhas. Lightning conductors. Different kinds of Decorations. Painting. Varnish. Distemper. Paper hanging. Dados and skirtings.

*Heating, cooling and ventilation.*—Object of heating. Open fires and stoves. Main objects of ventilation. Quantity of air required. Points for successful ventilation. Different systems of ventilation. Natural ventilation. Plenum system and cooling of rooms.

*Reinforced concrete construction.*—Simple calculation relating to the design of simple columns, beam slab and T beams.

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### Roads.

(1st and 2nd Year).

*Introductory general principles.*—Roads, why made. Paths. Limiting grade. Direction. Deviations. Towns near line. Obligatory points. Ravine crossing. Widths.

*Contours and gradients.*—Contours. Scale of slopes. Gradients. Minimum and ruling gradients. Considerations for fixing maximum gradient for any given surface. Maximum gradient in the plains and hills.

*Curves and Culverts.*—Curves. Increased width at Curves. Super-elevation. Curves at railway crossings. Culverts. Culvert approaches.

*Section of a metalled road in the plains.*—Land. Bank. Metalling. Shape of profile. Side slope. Platforms for repair metal. Railings, Furlong, mile, and boundary stones. Trees. Crossings. Shelter.

*Survey, Design and Estimate for a metalled road in flat country.*—Cross section. Traverse. Survey. Drawings. Formation line. Estimate. Lining-out. Construction.

*Kankar collection and consolidation.*—Kankar. Quarries. Rates. Stacks. Collection. Size. Consolidation. Scarifying. Spreading. Ramming. Lights. Ptries. Ruts. Cost.

*Stone collection and consolidation.*—Stone. Size. Cost. Stone crushers. Tests. Consolidation. Binding. Water. Scarifying. Dry rolling. Lights, etc. Steam rollers. Foundations and spreading. Consolidating, iron rollers.

*Road Maintenance.*—Gang. Order book. Patching. Ruts. Duties of gang. Repairs. Bridge inspections. Registers. Depths of metal. Quantity of metal required.

*Arboriculture.*—Scheme. Useful trees. Nurseries. Planting out. Guards. Watering. Tending. Lopping.

*Earth roads. Temporary roads. Bridle roads.*—Drainage. Grades. Split log drag. Repairs. Temporary roads. Sand. Marshy land. Hill roads. Cliff gallery. Bridle roads. Cross section. Drains. Parapets. Bridges and scuppers. Repairs.

*Dust-prevention.*—Dust producers. Watering. Sea-water. Descriptions of different materials used for dust prevention.

*Streets, carriageways, gutters, sidewalks.*—Streets. Widths. Materials. Crown. Granite sets. Wood blocks. Bricks. Ideal pavement. Gutters. Sidewalks. Gullies.

*Hill Roads.*—Vertical and horizontal systems. Road trace. Starting survey. Method for narrow roads. Areas of cutting. Retaining and breast walls. Inward and outward slope. Section with a crown. Width. Gutters. Scuppers. Drainage. Lining out. Measuring work. Maintenance.

*Appendices.*—

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## Railways.

(2nd Year).

*Introduction.*—Land. Earthwork. Road and Level crossings. Fencing. Types of Bridges. Grades and ruling gradients.

*Permanent way and Ballast.*—Permanent way. Bull-head and Flat-footed rails. Method of fixing rails to sleepers. Requirements of permanent way. Fish-plates and joints. Chairs and other supports. Fastenings. Wooden sleepers. Sleepering of girder bridges. Metal sleepers. Ballast. Functions of ballast. Materials used for ballast. Minimum depth of ballast. Packing and boxing.

*Points and Crossings.*—Sets of points or switches and what they consist of. Stud-bolts. Clearance. "Throw" of tongues. Points, how worked. Crossings. "V" and Diamond crossings. Arrangement of wing-rails. Facing and trailing points. Minimum lengths of switch permitted. Turn-outs. Nose of crossing. Sleepering of turn-out. Crossover road. Following points.

*Station Works and requirements.*—Essential features of all stations. Passenger station buildings. Passenger platforms. Goods platforms Sidings.

*Definitions of Station Machinery including.*—Engine sheds. Turntables. Triangles. Water columns, ash pits and fuel-stages. Carriage examining pits. Signals. Signal mechanism. Point indicators. Buffer stops. Scotch blocks.

*Plate-laying.*—Laying out on prepared formation. Details of distribution of labour at rail-head. Method of linking in. Operation of fish-plating. Packing gangs. Curves. Jim crow.

*Superelevation and the formula for it.*—

*Elementary description of Signals and their uses including Interlocking.*

*Maintenance of Railways.*—Permanent way maintenance. Creep. Wear of rails. Check rails. Renewals of rails and sleepers.

## Bridges.

(2nd Year).

*Introduction.*—Various types of bridges.

*Site, Waterway and Design.*—General remarks regarding sites.

*Temporary Bridges.*—Causeways. Types of Trestles. Trestles bridges. Superstructure of roadway. General description and uses of the following bridges, *viz.*—Pile bridges. Bridges on crate piers. Wooden truss bridges. Cantilever bridges. Suspension bridges. Floating bridges. Types of rope and cordage. Anchorages. Holdfasts.

*Foundations, piers and abutments.*—Ordinary foundations in dry ground. Foundations in soil charged with water. Methods for building foundations under water. Well foundations. Steel Caissons. Use of compressed air. Hollow iron and screw pile foundations. Piles and pile driving. Loads on foundations. Piers, abutments and wing walls.

*Arched bridges of masonry, brick-work and concrete.*—Shape of arches. Bond of brick and masonry arches. Centerings. Thickness of arches. Concrete arches. Abutments. Spandrels. Blocking course. Parapets. Roadway. Architectural features. Loads. Arched bridges of large spans.

*Reinforced Concrete Bridges.*—General remarks. Systems of reinforcement and materials used. Forms of bridges for which used. Centerings and false work.

*Iron and Steel Bridges.*—Materials of construction. Types of bridges. Roadway. Girder bearings. Erection of girders. Testing girders after erection. Revets and Riveting.

**Field Engineering.***(2nd Year).*

- (i). *Use of Spars.*—Various knots and lashings and the suitability of each to certain circumstances. Coiling and handling of ropes. Blocks and tackle. Reeving of blocks. Use of handspikes and rollers. Hold-fasts. Guys. Use and construction of derricks, shears, gyps, and trestles in placing girders or columns in position in building or for other similar work.
- (ii). *Ground-Tracing.*—General principles (*Masonry Manual*). Working plans for foundations on level ground and on slopes, Trenches with vertical and with sloping sides. Laying out buildings on the ground and similar practical instruction.

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**Estimating.***(2nd Year).*

Definitions.

Rules out taking on quantities in a road, house, bridge, canal.

Rules for deductions.

Rules for taking on quantities of roofing, flooring, wood-work, iron-work, doors, windows and arches.

Calculation of probable quantities of each kind of material required to be furnished for the completion of a work.

Calculation of rates.

Taking out quantities and framing estimates from working drawings of the following examples :—

1. A house.
2. A masonry culvert or bridge.
3. A very small steel bridge.
4. Iron roof on steel trusses.
5. A reinforced concrete structure.
6. Portion of a road in cutting and embankment.
7. Earthwork of a canal.

Use of Tables for the area of side slopes.

**Notes on Works.***(1st and 2nd Years).*

Each student will keep a Note-book and record in it descriptions and sketches of any materials, manufactures, or works, visited by him.

Advantage will be taken of every work of repair or construction under execution in or near Roorkee, by careful inspection, both under the instruction of a master and independently. Full notes and sketches are to be recorded by students in their Note-books, which are to contain no transcripts from their Text-books. The date of each visit to a work should invariably be recorded at the head of the notes adverting to the same.

These Note-books will be inspected once a month, and marks will be allotted at the end of each Term.

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**Irrigation**
*(Part I. only).**(2nd Year).*

*Introduction*—Definition. Importance of Irrigation. Functions. Improvement of crops.

*Well Irrigation*.—Source of supply of well water. Sub-soil reservoir. Sub-soil water levels. Cone of percolation. Movement of sub-soil water. Quantity of water available. The Mota. Use of Mota. Entry of water to a well. Artificial mota. Drainage cones. Classes of wells. Sinking wells. Depth of sinking. Masonry percolation wells. Methods of raising water from wells in ordinary use. Area protected by wells.

*Channels*.—Definition of duty. Depth of water. Fixing the required discharge. Longitudinal section. Velocities suitable to ordinary soils. Silt deposits. Bed slopes for main canals. Distinction between Canal. Distributary and Minor. Dimensions of channels. Position of bed line on distributaries. Cross section of distributary. Disposition of spoil banks. Brief notes on high embankments (para. 84). Approximate losses by percolation and evaporation. (Use of discharge tables and charts). Tatils and Colabas.

*Head Works.*—Points to be observed in selecting sites for head works. Main weirs. Brief description of three types, *i.e.*, Narora, Okhla and Paricha. Height of weirs. Afflux. Drop shutters, necessity for. Length of weirs. Tendencies of weirs to fail. Foundations of weirs, description of. Instances of failure of weirs. Under-sluices, necessity for. Under-sluices brief description of. Object and description of groynes below weirs. Various systems of lifting sluices. Talus below weirs, object and description of. Afflux embankments. Canal Head Regulators, brief description of. Temporary bunds.

*Drainage Crossings.*—Depth of canal fixing the method to be used for drainage crossings, *viz.*:—(i) Superpassage, (ii) Level Crossing, (iii) Aqueduct, (iv) Inlet. Brief description of above works as typified by (a) Pathri, (b) Dhanauri and (c) Solani Aqueduct.

*Works.*—Regulators, brief description. Falls, object of and description of type fall. Object of a raised crest. Brief description and object of a notched fall. Rapids. Bed bars. Escapes. Bridges, types of and description. Mills. Plantations. Water courses. Outlets. Earthwork in distributaries. Puddling banks. Consolidating banks.

*Drainage Works.*—Importance of draining and irrigated area. Silt tanks.

*Training Works.*—Object of. Dead water. Straightening channels. Temporary training works. Methods of influencing current.

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## Sanitary Engineering.

### PART I. WATER-SUPPLY.

(2nd Year).

*Rainfall and source of supply.*—Variations. Average annual rainfall. Losses by absorption and evaporation. Available rainfall. Sources of supply. Testing quality of water.

*Gravitation supply.*—Drainage area. Size of reservoir. Best site for a dam. Types of dams. Subsidiary works. Outlets and Valve towers. Aqueducts. Pipe crossings. Hydraulic gradient. Break pressure or balancing reservoirs.

*Pumping arrangements.*—Intakes and unfiltered water pumping stations. Filtered water stations. Tests. Rising mains.

*Water-supply from wells.*—Types of wells. Shallow and deep wells. Driven tube wells in soft soil. Varieties of tube wells. Tests of yield of wells.

*Purification.*—Mineral and organic impurities. Impurities from different sources. Settling tanks. Filters. Clear water reservoirs. Methods of sterilization.

*Distribution.*—Intermittent and continuous systems. Service reservoirs. Distribution Pipes. Pipe fittings. House connections. Pressure. Alignment of mains and sub-mains. Method of calculating sizes of pipes.

Meters and waste preventions.

## Sanitary Engineering.

### PART II.

(2nd Year).

*Systems of collection and removal of refuse.*—State of sanitation in India. Systems of removal of refuse. Conservancy.

*Sewers and underground drains.*—Alignment. Separate system. Materials used in construction. Fall and velocity. Flushing. Catch pits and gullies. Manholes. Clearing obstructions. Ventilation. Sub-soil drainage. Storm overflows.

*Surface drains.*—Alignment. Sections. Provision for rain water. Flushing and cleaning. Junctions. Road crossings.

*House drainage.* Water closets. Flushing. Soil pipes. Urinals. Sinks. Baths. Lavatories. House drains. Indian adaptations. Connection with sewers. Privies and water closets for Indians. Pail Depôts.

*Public conveniences.*—Dry pattern latrines. Water flushed latrines. Trough latrines. Urinals. Underground conveniences.

*Sewage disposal.*—Selection of site for outfall. Purification by (a) land irrigation, (b) intermittent and filtration, (c) septic tank, (d) contact beds. Continuous trickling filters. Tests of purification.



## GROUP II.—PURE AND APPLIED MATHEMATICS.

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### Elementary Mathematics.

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(1st Year).

#### Geometry.

Students will be expected to be familiar with the subject matter of Hall and Stevens School Geometry, Parts I.—V. Students will also be expected to solve simple riders and to apply the propositions practically in the solution of easy graphical problems requiring geometrical drawing.

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#### Trigonometry.

Angles and their measurements; Trigonometrical ratios. The relation between the ratios of complementary and supplementary angles. General properties of ratios including simple cases of multiple and sub-multiple angles. Simple identities and equations. Elementary properties of triangles. Use of logarithms and trigonometrical tables. Application to the solution of triangles and simple problems relating to heights and distances. Relation between the circular measures and trigonometrical ratios.

*Note.* — Slide rule will be used as far as possible.

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#### Mensuration.

Lengths of chords and area of a circle. Areas of plane rectilinear figures; and of segments and sectors of circles. Application of formulæ for surface and volumes of cones, frustum of cones, spheres, zones of spheres, pyramids, prisms and cylinders. Use of the planimeter. Special stress will be laid on abridged methods of calculation.

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#### Elementary Mechanics.

- (a). ~~Conception~~ **Conception** of force. Stress and strain. Gravitational units of ~~force~~ **force**. Elementary laws relating to concurrent forces. **Parallelogram** and triangle of forces. Lami's theorem. Parallel forces. Force and funicular polygons. Moments. Elementary

conditions of equilibrium. Centres of gravity in some simple cases. Principle of work. Simple machines, namely, lever, inclined plane, screw, pulleys, wheel and differential pulley; velocity ratio, mechanical advantage and efficiency.

(2nd Year).

- (b). Laws of motion. Absolute unit of force. Simple examples on rectilinear motion including the principles of energy and momentum.

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### **Elementary Applied Mechanics.**

Behaviour of elastic bodies under stress. Elastic limit and ultimate strength. Young's modulus, factor of safety. Calculation of cross sectional areas of a tie rod. Application of Gordon's formula to find safe stress in a compression member. Graphical determination of stresses in simple roof frames including the effect of wind pressure. Simple cases of bending moment and shearing force diagrams for cantilevers and simply supported beams. Moments of resistance of rectangular beams. The manner in which the bending moment is resisted and the flange stresses in I beams. Neutral axis and its location. Design of wooden beams by the method of rupture.

Stiffness of beams and its calculation from the deflection formulæ for simple cantilevers and beams under (1) a distributed load and (2) a single concentrated load. Graphic testing of retaining walls and arches.

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### **Hydrostatics and Hydraulics.**

Fluid pressure at a point in a mass of liquid at rest, and on a plane surface partly or wholly immersed. Intensity of pressure and whole pressure. Centre of pressure in simple elementary cases. Atmospheric pressure. Barometer, Syphon, Air and water pumps.

Velocity afflux through orifices. Fluid friction and application of formulæ for discharge through pipes and over weirs to practical cases.

**GROUP III.—Surveying.**

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(1st Year).

*Instruments—their use and adjustments.*—Parts of instruments. Magnetic compass and variation. Description, use and adjustments of Theodolites. Errors in using a Theodolite. Useful hints on the Theodolite. The Level. Description, use and adjustments of Levels. Choice of an instrument. The Levelling staff. Method of observing the staff.

*Levelling.*—Object of Levelling. Datum. Bench-mark. Theory of Levelling. Procedure in Levelling. Level surface and Horizontal surface. Curvature and refraction. Different classes of Levelling. Levelling Field-books. How to keep the record. Care of instrument. Use of boning rods.

*Chain Surveying.*—The measuring chain Ranging a line. Surveying by the chain only. The hand sketch. Method of finding direction of meridian by the sun's shadow. Station points. Tielines. Offsets. The Field-book. Scale of plan. Method of plotting. A chain survey will be done in the field by the class.

*The prismatic Compass.*—Bearings and angles. Description of Prismatic compass. Method of using Prismatic compass. The Field book. Plotting the surveys. How to adjust a closing error. Filling in a survey. Finding one's place in a survey. A chain and compass survey will be done in the field by the class.

(2nd Year).

*Traversing and its computations.*—Definition of a traverse. Gale's Traverse system. Conditions of a closed traverse. Method of the surveying by Interior angles. The Traverse Table. How to apply corrections. Method of plotting the traverse. Limit of error in traversing. Likely errors in chaining. A traverse with the Theodolite will be done in the field by the class.

*Plane-tableing.*—The plane-table equipment. Sight rule and magnetic compass. Finding one's place. Triangle of error method by resection. Plane-tableing methods. Engineering Contouring. After doing the traverse as mentioned in the previous para., the interior detail will be filled in by plane-table survey.

*Curves and Alignments.*—Definitions of properties of a circle. Theory of curves. Method of setting out a simple curve with (i) a 100-foot chain and theodolite; (ii) by offsets from tangents and chords produced; (iii) by offsets inside the curve. Methods of calculation when curves start or end with sub-chords. Problems in simple and compound curves. Curve of deviation.

*Engineering Surveying.*—Engineering project. Preliminary surveys. Least area of country to be surveyed. Details which will be required. Levels. Road in open level country. Hill roads. Railway and Canal surveys. Trial levelling and surveying. Drainage lines. Bench-marks. Running the traverse. Maps and drawings required in an engineering project, for Road, Canal or Railway Project.

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### GROUP IV.—Drawing.

(1st Year).

1. Architectural colouring.
2. Scales and Arches.
3. Specimen survey plan.
4. Elementary projection and sections of solids.
5. Projection.
6. Doors and windows.
7. Railway or road plan section.
8. Small building with original section.
9. Railway Culvert with original section.
10. Bungalow with original section.

Model drawing.

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(2nd Year).

1. Building from specification.
2. Building from measurement.
3. Elementary perspective.
4. Drawings of simple models and from memory.

*Note.*—All Drawing plates must be done in College during drawing attendances and they must have the date of commencement and completion, with the student's name, and order of standing in his class at the left-hand bottom corner.

Fancy borders and ornamental printing are strictly forbidden.

**GROUP V.—MECHANICAL ENGINEERING.**

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**Workshops.***(1st and 2nd Years).*

The object of the course is to familiarise students with the appearance, structure, and properties of materials commonly used in engineering and with the tools and processes by which they are shaped.

*Carpentry and Pattern making.*—A series of simple exercises will be provided including the preparation of various types of joints used in wood work and Elementary Pattern making.

*Foundry.*—The use and preparation of sand moulds, and the explanation of Foundry methods.

Students will be provided with simple patterns and cores from which they will prepare moulds and make castings in white metal, etc.

*Forge.*—Use of tools employed in Forge work. Exercises in drawing down, upsetting, welding, etc. Elementary practice in the heat treatment of steel.

*Fitting and Machine Shop.*—Use of hand tools in bench-work. Cutting tools and their action. Characteristic features of simple machine tools. Simple exercises in soldering and brazing.

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**Descriptive Mechanical Engineering.***(1st Year).*

*Fastenings.*—Screws, Bolts, Nuts, their production and uses. Rivets and riveted joints, standard iron and steel sections.

*Boilers.*—Shell, Water tube and Firetube. Description of the more common types, their erection and inspection. Boiler accessories, description and uses. Steam pipe lines. Arrangement and Lagging.

*Steam Engines.*—Description of the simplest types, including Portable Engine. Engine foundations. Erection.

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*(2nd Year).*

*Internal Combustion Engines.*—Description of oil, petrol and Gas Engines. Foundations. Location of starting and running faults.

*Hydraulic Machinery.*—Laying and anchoring of pipe lines. Description of Pelton wheel and Francis Turbine. Description of common types of reciprocating and Centrifugal pumps and Pulsometers.

*Power Transmission.*—Elementary treatment of power transmission by means of belts, gearing, ropes, chain and friction drives.

Lectures will be illustrated by models, wall diagrams of modern machinery and conducted inspections of examples of the above machinery in the College Workshops and Laboratories.

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## GROUP VI.—GENERAL.

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### Elementary Science.

(1st Year).

The subject is an elementary one and is taken up with special reference to the Engineering subjects. The Elementary Physical principles taught are illustrated by numerical examples in tutorial work and the measurement of principal quantities involved is carried out in the Physical Laboratory by students in a simple manner.

*General Measurement.*—Fundamental units in C.G.S and F.P.S. systems. Measurement of length, area and volume. Mass density and specific gravity. Buoyancy. Determination of specific gravity by simple methods. Atmospheric pressure and Boyle's Law; Fortin and aneroid barometers; siphon, pressure gauges and water pumps.

*Heat.*—General effects of heat; mercury thermometer and its graduation. Centigrade and Fahrenheit scales of temperature. Expansion of solids, liquids and gases with simple applications; Charles's law. Units of heat, specific heat; its measurement by the method of mixtures; measurement of specific heat of liquid by the method of cooling. Laws of fusion and ebullition, melting and boiling points; latent heat; evaporation, cold produced by evaporation. Transfer of heat by conduction, convection and radiation with simple applications of these methods. Heat and work, mechanical equivalent of heat. Calorific value of coal. Thompson's Fuel Calorimeter.

*Light.*—Rectilinear propagation of light : shadows. Units of illumination and illuminatory power : Photometers. Laws of reflection and refraction : mirrors and lenses.

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### **Accounts.**

*(2nd Year).*

Explanation of the ordinary terms used in book-keeping as they arise during the course. Description and uses of the following :—

Cash book ; petty cash and imprest ; invoice or purchases book ; stock book ; day or sales book ; bills book.

Students will work out examples after the necessary explanations have been given.

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### **Elementary Electrical Engineering.**

*(2nd Year).*

Production of electricity by friction and induction. Dual nature of electricity. Gold leaf electroscope. Seat of statical charge on a conductor. Action of points.

Properties of electric current, analogy between the electric current and flow of water.

The electric current, pressure and resistance ; definition of ampere, volt, and ohm. Measurement of resistance by the Wheatstone's bridge and Walker's apparatus. The magnet and the magnetic field.

The lightning conductor, parts used in and general rules for erection ; function of the lightning conductor. Earth resistance of the conductor and method of measuring it. Other test to see that the conductor is in good condition.

*House Wiring.*—Principles laid down by Government in “Specifications for internal wiring.”

*D. C. Power Plants.*—Lay-out of simple D. C. distribution systems. Description and working of simple switchboards. Protection devices and knowledge of normal faults in a small power station. The course will not include the theory or manufacture of Electrical Machinery, but Laboratory demonstrations will be given of every principle dealt with in the course.

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## **Ferrotypes.**

*(2nd Year).*

*Apparatus.*—General description of materials required, and where these may be procured ; approximate estimate of their cost.

Pressure frame. Description of suitable wood. Selection of plate-glass. Preparation of printing pads. Approximate estimate of the cost for frame. Trays for washing and developing. Description of materials used.

*Working Room.*—How an ordinary room may be converted to one suitable for Ferrotypes printing, with fittings necessary for the probable extent of work. Rough detailed estimate of the cost.

*Paper.*—Qualities desirable in paper. Practical test as to suitability for work generally.

*Tracings.*—Tracing cloth and tracing paper. Essential points to be observed in the preparation of tracing generally. Suitable ink, and how it should be rubbed down and used. Colour washes.

*Chemicals.*—Chemicals required. Precautions to be observed in storing. Practical lessons in simple chemical manipulations. Where chemicals may be procured ; details of cost.



*Printing.*—Explanations of the action of light on iron salts. Practical illustrations showing the effects brought about by the application of re-agents, and the chemical changes which take place in each case.

The Ferro-prussiate (white lines on a blue ground), and Ferrogalic (black lines on a clear ground) printing processes.

Sensitising, drying and storing paper and cloth. Printing in diffused and direct sunlight. Methods of preparing copies without the aid of pressure frame.

Developing, intensifying, reducing, trimming and removal of defects. Additions or obliterations, in white, blue or black, of lines, figures printing, etc., by chemical or other means.

*Mounting.*—Preparation of the adhesive mixture. Practical instruction in mounting on cloth and boards.

*Practical Course. Independent.*—A tracing to be prepared specially for reproduction work by each student. Three good clear copies in each process from the tracing to be submitted on papers which are sensitised, and all the manipulations carried by the student himself, and three good copies to be submitted on commercial ready-sensitised papers, all other manipulations being carried out by the student.

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## GROUP VII.—PROJECT.

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(2nd Year).

The Project will consist of two or more simple exercises in Civil Engineering Design and Field Work (*see* page 125).

**GROUP VIII.—PHYSIQUE.***(1st and 2nd Years).*

Physical Drill. Proficiency in games and athletic sports ; Physical and moral fitness for work in the engineering profession. (*See* page 125).

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## COURSE OF STUDY AND SYLLABUS.

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### DRAFTSMAN CLASS.

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*College attendances.*—Throughout the year, from 9 A. M. to 12-30 P. M., and from 1-30 P. M. to 3 P. M., except for one or two short periods of leave.

*Length of Course.*—Usually 3 years, but it may be less in the case of specially efficient students.

*Syllabus.* *1st year.*—Italic and Block printing in various styles, and copying from printed specimens (same size).

*2nd year.*—Reduction and enlargement to scale. Finished drawings from original maps or diagrams.

*3rd year* —Drawings from measurement of buildings or sites, with full details, and Ferrotypes in all its branches.

A special Instructor is in charge of the Draftsman Class.

*Marks.*—No marks are given, but the Principal inspects the whole work of every student at the end of each College Session and decides which students are qualified for promotion to the next year, or for the award of a certificate as a Draftsman or Tracer in the case of the advanced students.

*General.*—Most of the students are trained as simple Draftsmen and Tracers and not as Computers or Estimators. Those who do not attain to the Draftsman standard may obtain certificates as Tracers; and those who, in three years, do not attain to a proper standard may be required to prolong their course, or to leave the College without a certificate. The training of a few selected students in simple estimating in their 3rd year has been introduced. Those who pass the annual test in Estimating will have an entry on their certificates as "qualified in Simple Estimating."

*Discipline.*—For discipline the students come under the ordinary College regulations while in the College.



## ANNUAL PRIZES.

*N.B.*—No prize will be awarded when the competition for it is insufficient or for any other adequate reason.

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### CIVIL ENGINEER CLASS.

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THE COUNCIL OF INDIA PRIZE OF Rs. 1,000.

To the most distinguished Student who shall obtain the Higher Certificate.

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THE THOMASON PRIZE OF Rs. 250.

To the most distinguished student, who obtains the Higher Certificate, but does *not* gain the Council of India Prize.

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RAI BAHADUR KANHAIYA LAL'S GOLD MEDAL.

For the most distinguished *Indian Student* of the year who does *not* obtain the Thomason Prize.

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THE THOMASON GOLD MEDAL, AND BOOKS WORTH Rs. 25/- FROM 1929.

To the Student of the *Civil Engineer Class* who shall furnish the best Engineering Designs of the year of a certain minimum excellence.

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THE CAUTLEY GOLD MEDAL.

To the best Mathematician of the class who shall obtain not less than *two-thirds* of the total marks in Group I.

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CALCOTT-REILLY MEMORIAL GOLD MEDAL.

For the best passed Student of the Civil Engineer Class in Applied Mechanics.

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GENERAL MACLAGAN'S PRIZE.

For Experimental Science.

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SILVER MEDALS.

CIVIL ENGINEERING (THEORY).

SURVEYING.

DRAWING.

PHOTOGRAPHY AND FERROTYPE.

ACCOUNTS.

MECHANICAL ENGINEERING.

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LABORATORY WORK.

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SUSHILA AND J. MITTRA MEMORIAL SILVER MEDAL FOR THE  
BEST INDIAN STUDENT IN CHEMISTRY.

## OVERSEER CLASS.

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GENERAL MERIT. SILVER MEDAL AND RS. 100.

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KEY MEMORIAL PRIZE. SILVER MEDAL AND ABOUT RS. 18.  
For the best Estimator in the class.

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RAI BAHADUR KANHAIYA LAL'S SILVER MEDALS.  
For the two best *Indian Students* in the class.

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FAIRLEY MEMORIAL SILVER MEDAL.  
For the Student who obtains the highest number of marks in  
Applied Mechanics.

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SULLIVAN MEMORIAL SILVER MEDAL FOR MECHANICS.

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### SILVER MEDALS.

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MATHEMATICS.

CIVIL ENGINEERING.

SURVEYING.

DRAWING.

PHOTOGRAPHY AND FERROTYPE.

ACCOUNTS.

WORKSHOP PRACTICE.

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## DRAFTSMAN CLASS.

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GENERAL MERIT. SILVER MEDAL AND RS. 30.

2nd Prize ... .. RS. 20.

INDEPENDENT TECHNICAL WORK SILVER MEDAL.

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## GENERAL.

*Harcourt Butler Challenge Cup* for the best Civil Engineer class student in the College in work and athletics, combined. *Sandes*

*Challenge Cup* for the best student in the College in games and sports combined. *Lion Trophy*, a challenge trophy for the best student in the College in Athletic Sports, and a *Runner-up Challenge Cup* for the second best student. *Vizianagram Cup*, a cup presented annually from a fund founded by His Highness the Maharajah of Vizianagram, to the best Indian student in Athletic Sports in the 3rd year of the Civil Engineer Class. There are also numerous challenge cups open to all students in the College, or to students in particular classes, for tennis, squash racquets, rowing and other recreations (*see* the Prize list at the end of this volume).

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TEXT BOOKS RECOMMENDED.

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## TEXT-BOOKS RECOMMENDED FOR THE DIFFERENT CLASSES.

Subject.	Civ. Engineer Class.		Overseer Class.	
Department of Civil Engineering : for Syllabus, see Group I.				
Building Materials	...	Roorkee Manual, Building Materials	...	Same as Civil Engineer Class,
Masonry	...	Roorkee Manual, Masonry		Ditto
Earthwork	...	Ditto Earthwork	...	Ditto
Carpentry	...	Ditto Carpentry	...	Ditto
Field Engineering—				
1. Use of Spars	...	Manual of Military Engineering	...	Ditto
2. Ground Tracing	...	Roorkee Manual, Masonry	...	Ditto
Buildings	...	Ditto Buildings	...	Ditto
		Military Works Hand-book	...	...
		Molesworth's Pocket Book	...	Same as Civil Engineer Class,
Bridges	...	Roorkee Manual, Bridges	...	Ditto
Estimating	...	Ditto Estimating	...	Ditto
Roads	...	Ditto Roads	...	Ditto
Structural Engineering, and Theory and Design of Structures—		Theory and Design of Structures by Andrew's.		...
		Further Problems in the Theory and Design of Structures by Andrew's.		...
		Husband and Harby's Structural Engineering.		
Reinforced Concrete	...	Taylor and Thomson's Concrete Plain and Reinforced.		:
		Faber and Bowie's Reinforced Concrete.		Cantell's Elementary Course, Reinforced Concrete Construction.
Railways	...	Roorkee Manual, Railways	...	Same as Civil Engineer Class.
Irrigation	...	Roorkee Manual, Irrigation	...	Ditto
		Gibson's Hydraulics for Engineers	...	...
		Buckley's Pocket Book	...	...
		Practical Design of Irrigation Works by W. C. Bligh.		...
		Madras, College of Engineering Manual, Irrigation.		
Water-Supply	...	Roorkee Manual, Sanitary Engineering, Part I.		Same as Civil Engineer Class.
		Don and Chisholm's Modern Methods of Water purification.		...

**TEXT-BOOKS RECOMMENDED FOR THE DIFFERENT CLASSES—(contd.)**

Subject.	Civil Engineer Class.	Overseer Class.
Water-Supply ...	Mepherston's Distribution. Box's Practical Hydraulics.  Flinn's Hand-book of water works, Design.	
Process Work ...	Roorkee Manual, Ferrottype Printing Process.	Same as Civil Engineer Class.
Sanitary Engineering ...	Roorkee Manual of Sanitary Engineering, Part II. Kershaw's Manual of Sewage Disposal. Whyatt's Sewers and Sewerage. The Ministry of Health, Requirements and other Engineering Memoranda by S. H. Adams York. Instructions for the preparation of drainage projects issued by Superintending Engineer, Public Health Department (United Provinces). Santo Crimp's Tables.	Ditto ...
Recommended for General Study.	Waddell's Bridge Engineering. The Design and Construction of Dams by Wegman. A History of Architecture by Banister and Fletcher. Prelini and Hill's Tunnelling. Accounts, Public Works Department Code Hamilton and Ball's Book-keeping.	... [...] ... . ... ...

**Department of Pure and Applied Mathematics : for Syllabus, see Group II.**

Elementary Mathematics, (including Arithmetic, Algebra, Geometry, Trigonometry, and Mensuration).	...	Kirkman and Field's Arithmetic. Pierpoint's Mensuration Parts I and II. Hall and Steven's Practical Mathematics.
Higher Mathematics (including Geometrical Conics, Analytical Geometry, Differential and Integral Calculus).	Gibson's Treatise on Graphs. Loney's Co-ordinate Geometry. Fawdry and Durrel's Calculus (for 1st year). Lamb's Infinitesimal Calculus (for 2nd year). Course of Elementary Calculus by B. D. Puri.	...
Elementary Mechanic (including Hydrostatics and Mechanical Laboratory).	Landon's Dynamics. Jessop and Caunt's Hydrostatics.	A first Statics and a first Dynamics of Dent's Mathematical series.

## TEXT-BOOKS RECOMMENDED FOR THE DIFFERENT CLASSES—(contd.)

Subject.	Civil Engineer Class.	Overseer Class.
Applied Mechanics (including Hydraulics, Strength of Materials, and Theory of Structures).	Lea's Elementary Hydraulics. Andrew's Further Problems in Theory and Design of Structures. Morley's Theory of Structures.	Roorkee Manual of Hydraulics. Rivington's Building Construction Part IV.

## Department of Surveying and Drawing for Syllabus :—

	<i>See Group III.</i>	<i>See Group I. I &amp; IV.</i>
Surveying ...	Roorkee Manual of Surveying, Parts I and II.	Roorkee Manual of Surveying, Part I.
Drawing ...	Roorkee Manual of Drawing, Parts I and II.	Same as for Civil Engineer Class.

## Department of Applied Science for Syllabus :—

	<i>See Group IV.</i>	
Chemistry ...	Taylor's Students' Chemistry. Francis Jones's Junior Course of Practical Chemistry.	...
Applied Chemistry, including Metallurgy and the Chemistry of Building Materials.	Lectures—No text-book	...
		<i>See Group VI.</i>
Natural Science ...	...	Gregory and Hadley's Class-book of Physics, Parts III and IV.
Heat and Light ...	The Tutorial Physics, Parts II, III, V and VI. Duncan and Starkings' Physics. Heat by Randall.	...
Electricity and Magnetism.	Technical Electricity by Davidge and Hutchinson. Magnetism and Electricity by Richardson.	...
Geology ...	Giekie's Class-book of Geology	...
Mineralogy ...	Hatch's Mineralogy	...

## TEXT-BOOKS RECOMMENDED FOR THE DIFFERENT CLASSES—(concl'd.)

Subject.	Civil Engineer Class.	Overseer Class.
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## Department of Mechanical and Electrical Engineering for Syllabus :—

Mechanical Engineering ...	<i>See Group V.</i>	<i>See Group V.</i>
	Low's Heat Engines ... ..	...
	Lea's Hydraulics ... ..	...
	Low's Applied Mechanics ... ..	Low's Heat Engines.
	McKay's Theory of Machines ... ..	...
		<i>See Group VI.</i>
Electrical Engineering {	Continuous Current Engineering, by A. Hay.	Junior Technical Electricity by R. W. Hutchinson.
	Alternating Current Electrical Engineering, by Philip Kemp.	Electric wiring by W. S. Ibbetson.
	Electrical Engineering Practice, by J. W. Meares and R. E. Neale, Volumes I and II.	Painters' Notes on Testing Lightning conductors.
	Electrical Distribution net works and Transmission Lines by Dr. Hay.	



## COPIES OF THE RULES FOR EXAMINATION.

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Copies of the rules relating to examination for entrance into the Civil Engineer, Overseer and Draftsman classes of the College are obtainable on application from the College on pre-payment of half anna postage.

## DUPLICATE CERTIFICATES.

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For duplicate examination certificates the following rates of fees are fixed :—

			Rs.
As Assistant Engineer	...	...	24
„ Upper Subordinate and Overseer	...	...	16
„ Lower Subordinate	...	...	8

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## SUBSIDIARY DEPARTMENTS OF THE COLLEGE.

### LIBRARY.

The College Library on 1st April, 1929 contained 30,035 volumes, classified as under:—

#### PART I.

##### Science and Professional Works.

Class AA. Pure Mathematics.	Class F. Mental, Moral and
„ AB. Applied Mathematics.	Social Science.
„ B. Physics.	„ G. Civil Engineering.
„ C. Chemistry.	„ H. Surveying and Drawing.
„ D. Geology, Mineralogy	„ J. Electrical Engineering.
and Palæontology.	„ K. Mechanical Engineering
„ E. Other Branches of	„ L. Other Professional
Natural Science.	Works.

#### PART II.

##### General Literature, Art, Industrial, etc.

Class M. Recreations and	Class S. Commerce & Economics
Amusements.	„ T. Agriculture, Forestry,
„ N. Geography, Ethno-	and Gardening.
graphy and Travel.	„ U. General Scientific and
„ O. History.	Professional Journals
„ P. Literature & Philology.	and Transactions.
„ Q. Arts and Trades.	„ X. Indian Government
„ R. Fine Arts.	Publications.

It is free to all Gazetted Government officers, and other outstation residents in special cases can obtain books on application and retain them for two months at a time.

There is a printed Catalogue, and a Supplement is issued every year, which can be obtained on application to the Curator, Book Depôt.

The last Supplement is corrected up to 1st April, 1928.

### **THE LITHOGRAPHIC AND APPLIED SCIENCE DEPARTMENT.**

This Department executes LITHOGRAPHY, PHOTO.-ZINCOGRAPHY, HELIO.-ZINCOGRAPHY, and BINDING of every description, also HALF-TONE and PROCESS WORK for books or illustrations. Primarily it works for the College publications and Government departments, but also for the general public.

The Photographic Section stocks a large number of negatives of views and objects of interest.

Catalogues will be supplied on application. Operators can be sent out to take photographs, if required.

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### **THE BOOK DEPOT.**

The Book Dépôt receives and sells the various publications of the College Press, of which printed Catalogues can be obtained free on application.

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### **THE COLLEGE REGISTER OF EMPLOYMENT.**

The College registers the names of, and supplies employers with approved Engineers, Upper Subordinates, Overseers, Lower Subordinates, Draftsmen, Tracers, Photographers and Lithographers.

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### **THE FOLLOWING INSTITUTIONS ARE ALSO MAINTAINED IN CONNECTION WITH THE COLLEGE.**

- |                                      |  |
|--------------------------------------|--|
| 1. CIVIL ENGINEERING MODEL<br>Rooms. | 7. DEHRA DUN CONTINGENT,<br>AUXILIARY FORCE INDIA,<br>ROORKEE DETACHMENT.  |
| 2. METEOROLOGICAL OFFICE.            |  |
| 3. WATER-WORKS.                      | 8. NO. 15 PLATOON, 3RD UNITED<br>PROVINCES BATTALION, UNI-<br>VERSITY TRAINING CORPS,<br>INDIAN TERRITORIAL FORCE. |
| 4. COLLEGE DAIRY.                    |  |
| 5. COLLEGE DISPENSARY.               |  |
| 6. SPORTS AND ATHLETIC<br>CLUBS.     |  |

## List of Donations to the Thomason College for Prizes and other Miscellaneous purposes.

<i>Year.</i>	<i>Names.</i>	<i>Rupees.</i>
1854	Subscribers to the Thomason Testimonial Fund	2,500
"	Sir Proby T. Cautley, K.C.B.	2,000
1856	Lieut. T. Wright, 46th N. I.	100
"	W. Marshall, 48th N. I.	100
"	T. E. Dickens, Artillery	100
"	G. Ballie, Artillery	100
"	Ensign H. E. Wish, 26th N. I.	100
"	Lieut. E. L. Earle, Artillery	100
"	E. Smalley, 36th N. I.	100
"	C. B. Wish, 14th Light Dragoons	100
"	A. B. Melville, 67th N. I.	100
1860	E. C. Garstin, 29th N. I.	100
"	E. S. Wood, 93rd Highlanders	100
1862	Capt. W. H. Mackesy, 79th Highlanders	100
1864	Lieut. E. C. Shepherd, General List, Infantry	100
1865	E. W. Samuels, " " "	100
"	B. J. Parsons, 23rd N. I.	100
"	H. H. the Maharaja of Cashmere	500
"	Lieut. J. E. Sandeman, General List, Infantry	100
"	Captain F. G. S. Parker, 54th Regiment	100
"	F. D. M. Brown, v.c., 101st Regiment	100
"	Lieutenant L. Wavell 22nd N. I.	100
"	Peter Keay, Esq.	120
1867	Lieutenant W. S. Lillingston, M.A., 7th Hussars	200
1868	E. C. Elliston, 58th Regiment	100
1869	Colonel R. Maclagan, R.E., (for "Maclagan" Prize Endowment)	1,000
"	Isser Chandar Sirkar	50
"	Sergt. W. Sinclair, R.E.	50
"	G. W. Dowsworth, Esq.	100
"	Mr. J. Mole	50
"	Mr. J. Lyons	50
"	Mr. S. Fraser	20
"	Sergt. P. Kelly	50
"	Lieut. G. Nolan	100
"	Mr. J. Ferris	20
"	Lala Bihari Lal	100
"	Mr. C. Chisholm	20
"	Mr. H. Mitchell	20

Year.	Names			Rupees.
1869	Mr. T. Gray	..	..	25
"	Mr. J. Southon	..	..	25
"	Sergt. A. Forsyth	..	..	30
"	Mr. J. H. Chapman	..	..	25
"	Mr. G. McArthur	..	..	50
"	Mr. J. Gillan	..	..	25
"	Mr. W. Phillips	..	..	300
"	Mr. C. Collogher	..	..	250
1870	Rai Bahadur Kanhya Lal (for 'Kanhya Lal' Prize Endowment)	..	..	100
"	Captain C. E. D. Branson, 37th P. N. I.	..	..	100
"	Dr. Murray Thomason, M.D., F.R.S.E.	..	..	200
1872	Lieutenant G. W. Martin, 88th Regiment	..	..	100
1873	W. Willcocks, Esq. (to Engineer Student Mess)	..	..	100
"	E. Hodges, Esq.	..	..	100
"	H. H. the Maharaja of Vizianagram	..	..	1,000
1874	R. B. Smart, Esq. (Rev. Sur.) (for Surveying Prize)	..	..	100
"	R. W. L. Hawkins, Esq. (to Engineer Student Mess)	..	..	100
"	Lieutenant W. T. McLaughlin, 48th Regiment, (to ditto)	..	..	100
"	Reginald H. McLaughlin, Esq. (to ditto)	..	..	50
1875	V. B. Paterson, Esq.	} (to ditto)	..	190
"	S. Jarman, Esq.			
"	F. J. McLaughlin, Esq.			
"	R. L. Campbell, Esq.			
"	R. W. L. Toozs, Esq. (to ditto)	..	..	100
"	A. E. Adie, Esq. (to ditto)	..	..	40
"	Lieutenant S. M. Maycock, R.E. (for Mechanism Prize)	..	..	50
"	R. B. Smart, Esq. (Rev. Sur.) (for Surveying Prize)	..	..	100
"	W. A. Francken, Esq., Assistant Superintendent, Canal Foundry (to College Recreation Fund)	..	..	50
1876	Lieutenant S. M. Maycock, R.E. (for Mechanism Prize)	..	..	50
"	Captain Allan Cunningham, R.E. (for Applied Mathematics Prize)	..	..	50
"	Subscribers to Keay Memorial (balance of subscriptions after erecting Tablet)	..	..	1,000
1877	H. H. the Maharaja of Jummoo and Cashmere	..	..	1,000
"	Raja of Rutlam	..	..	100
"	Captain Allan Cunningham, R.E. (for Applied Mathematics Prize)	..	..	50
"	Rai Bahadur Kunhya Lal (to change the Prize Endowment of 1870 to the "Rai Bahadur Kunhya Lal Gold Medal," similar to Thomason Medal)	..	..	1,500
"	Lieutenant S. M. Maycock, R.E. (for Mechanism Prize)	..	..	50
"	Colonel J. G. Medley, R.E. (yearly since 1863, at Rs. 50)	..	..	750
"	Major A. M. Brandreth, R.E. (for Note Book and English Prizes)	..	..	50
"	J. T. Farrant, Esq. (to Engineer Student Mess)	..	..	100
1878	Colonel J. G. Medley, R.E. (for Civil Engineering Prize)	..	..	50
"	Lieutenant S. M. Maycock, R.E. (for Mechanism Prize)	..	..	50

<i>Year.</i>	<i>Names.</i>	<i>Rupees.</i>
1878	Major A. M. Brandreth, R.E. ( <i>for Note Book and English Prizes</i> ) ..	50
"	Anonymous from Jhansi .. ..	100
1880	Colonel J. G. Medley, R.E. ( <i>for Civil Engineering Prize</i> ) ..	50
"	Lieut. S. M. Maycock, R.E. ( <i>for Surveying Prize</i> ) ..	50
"	Major A. M. Brandreth, R.E. ( <i>for Note Book, English and Romanised Urdu Prizes</i> ) ..	70
"	Babu Krishna Chandra Banerji ( <i>for Mathematics</i> ) ..	50
1881	Colonel J. G. Medley, R.E. ( <i>for Civil Engineering Prize</i> ) ..	50
"	Lieut. S. M. Maycock, R.E. ( <i>for Surveying Prize</i> ) ..	50
"	Major A. M. Brandreth, R.E. ( <i>for Note Book, English and Romanised Urdu Prizes</i> ) ..	70
"	W. P. Housden, Esq. ( <i>to Engineer Student Mess</i> ) ..	100
1882	Colonel J. G. Medley, R.E. ( <i>for Civil Engineering Prize</i> ) ..	50
"	Lieut.-Col. A. M. Brandreth, R.E. ( <i>for Note Book, English and Romanised Urdu Prizes</i> ) ..	70
"	Lieut. J. H. C. Harrison, R.E. ( <i>to Engineer Student Mess</i> ) ..	100
"	Lieut. J. H. C. Harrison, R.E. ( <i>for Surveying Prize</i> ) ..	50
1883	Colonel J. G. Medley, R.E. ( <i>for Civil Engineering Prize</i> ) ..	50
"	Lieut.-Col. A. M. Brandreth, R.E. ( <i>for Note Book, English and Romanised Urdu Prizes</i> ) ..	70
"	Lieut. J. H. C. Harrison, R.E. ( <i>for Surveying Prize</i> ) ..	50
1884	Lieut.-Col. A. M. Brandreth, R.E. ( <i>for Civil Engineering, Note Book and English Prizes</i> ) ..	100
1885	Lieut.-Col. A. M. Brandreth, R.E. ( <i>for Civil Engineering, Note Book and Estimating Prizes</i> ) ..	100
"	Lala Behari Lal ( <i>for Language Prize</i> ) ..	15
1886	Lieut.-Col. A. M. Brandreth, R.E. ( <i>for Civil Engineering, Note Book and Estimating Prizes</i> ) ..	100
"	Lala Bihari Lal ( <i>for Language Prize</i> ) ..	15
1887	Lieut.-Col. A. M. Brandreth, R.E. ( <i>for Civil Engineering, Note Book and Estimating Prizes</i> ) ..	150
"	Lala Bihari Lal ( <i>for Language Prize</i> ) ..	15
"	Rai Bahadur Kunhya Lal, to found Silver Medals for Natives of Upper and Lower Subordinate Classes ..	1,000
1888	Lieut.-Col. A. M. Brandreth, R.E. ( <i>for Civil Engineering, Note Book and Estimating Prizes</i> ) ..	100
"	Lala Bihari Lal ( <i>for Language Prize</i> ) ..	15
"	Rai Bahadur Kunhya Lal ..	100
1889	Lieut.-Col. A. M. Brandreth, R.E. ( <i>for Civil Engineering, Note Book and Estimating Prizes</i> ) ..	100
"	Lala Bihari Lal ( <i>for Language Prize</i> ) ..	15
1890	Lieut.-Col. A. M. Brandreth, R.E. ( <i>for Civil Engineering, Note Book and Estimating Prizes</i> ) ..	100
"	Lala Bihari Lal ( <i>for Language Prizes</i> ) ..	15
1891	Lieut.-Col. A. M. Brandreth, R.E. ( <i>for Civil Engineering, Note Book and Estimating Prizes</i> ) ..	

Year.	Names.	Rupees.
1891	Rai Bahadur Kunhya Lal ( <i>for Language Prize</i> ) ..	15
1892	Colonel F. D. M. Brown, V.C. ( <i>for Civil Engineering Prize</i> ) ..	50
„	Rai Bahadur Bihari Lal ( <i>for Language Prize</i> ) ..	15
1893	Major J. Clibborn ( <i>for Civil Engineering Prize</i> ) ..	50
„	Rai Bahadur Bihari Lal ( <i>for Language Prize</i> ) ..	15
1894	Major J. Clibborn ( <i>for Civil Engineering Prize</i> ) ..	50
„	Rai Bahadur Bihari Lal ( <i>for Language Prize</i> ) ..	15
1895	Major J. Clibborn ( <i>for Civil Engineering Prize</i> ) ..	50
„	Rai Bahadur Bihari Lal ( <i>for Language Prize</i> ) ..	15
1896	Lieut.-Col. J. Clibborn ( <i>for Civil Engineering Prize</i> ) ..	50
„	H. E. the Prime Minister of Nepal <i>for a Tower Clock</i> ..	2,500
1897	Lieut.-Col. J. Clibborn ( <i>for Civil Engineering Prize</i> ) ..	50
1898	Lieut. H. B. D. Campbell, R.E. ( <i>for Civil Engineering Prize</i> ) ..	12
„	Rai Bahadur Gobind Jas ( <i>for English</i> ) ..	16
1899-1900	Lieut.-Col. J. Clibborn ( <i>for Civil Engineering Prize</i> ) ..	12
1906-1922-1924	Babu Amar Nath Dutt, B.A., LL.B. ( <i>for best Indian student obtaining Sub-Engineer's certificate, U. S. class</i> ) ..	15
1906-1917	Lala Ram Sahai ( <i>for Language Prize, U. S. class</i> ) ..	15
1908	Members of the Fairley Memorial Prize Committee ( <i>for Applied Mechanics, U. S. class</i> ) ..	500
1909-1912	Sirdar Kishan Singh ( <i>for Drawing, Mechanical Apprentice class</i> ) ..	11
1909	Calcott-Reilly Memorial Fund has been transferred to this College on the abolition of the Royal Indian Engineering College, Coopers Hill, England ( <i>Gold Medal for Applied Mechanics</i> ) ..	1,800
„	Donations from Ghulam Nabi and other P. W. Subordinates to found the Sullivan Scholarship Medal Endowment Fund for the Lower Subordinates of this College ..	2,000
1911-1917	Rai Nathu Mal Sahib ( <i>for best senior Indian student, U. S. class</i> ) ..	95
1911-1914	Srijat Hem Chander Baugh ( <i>for Natural Science, Mechanical Apprentice class</i> ) ..	15
1921-1923	Sir Sidney Crookshank for cricket ..	30
1922-27	Sushila and J Mittra Memorial Silver Medal ..	15
1923-24	Babu Amar Nath Dutt, B.A., LL.B. ( <i>for best Indian student in Civil Engineer class in Civil Engineering Design</i> ) ..	15
1923	H. E Sir Edward MacLagan's prize ( <i>for best Civil Engineer class student in Civil Engineering Design</i> ) ..	100
1924-29	Babu Amar Nath Dutt, B.A., LL. B., ( <i>for best Indian Student Obtaining Higher Certificate in Overseer Class</i> ) ..	15

# RULES OF THE COLLEGE ADVISORY COUNCIL.

*Approved by Government.*

**Function.** 1. The function of the Council will be to advise Government on questions of policy, organization, finance, staff, buildings, equipment, the formation or re-constitution of classes, Curricula, rules of admission and any other subject connected with the College on which Government may require its advice. As the Council will be closely associated with the College and will visit it periodically, it will also be in a position to take the initiative in suggesting improvements and reforms in respect of any of the above matters.

**Constitution.** 2. The Council will consist of :—

- (1). The Chief Engineer, Public Works Department, Buildings and Roads Branch ;
- (2). The Chief Engineer, Public Works Department, Irrigation Branch.
- (3). The Divisional Superintendent, E. I. Railway., Lucknow.
- (4). The Director of Public Instruction, United Provinces ;
- (5). The Director of Industries, United Provinces ;
- (6). The Principal, Thomason College, Roorkee ;
- (7). A member to be nominated by the University of Allahabad ;
- (8). A member to be nominated by the Upper India Chamber of Commerce ;
- (9). A member to be nominated by the United Provinces Chamber of Commerce ;
- (10). One member of the Staff of the Thomason College, Roorkee, in addition to the Principal of the College, to be nominated by Government for a period of three years ;



- (11). One non-official member of the Board of Industries, United Provinces, to be elected by the non-official members of the Board from amongst their number ;
- (12). and (13). Two non-official members of the U. P. Legislative Council, to be elected by the non-official members of the Council ; and
- (14). A representative of the United Provinces branch of the Institution of Engineers, India.

**President.** 3. The senior Chief Engineer, Public Works Department or in his absence, the senior official member present, will preside. The ruling of the President in regard to all questions of procedure shall be final.

**Secretary.** 4. The Principal of the College will be *ex-officio* Secretary of the Council.

**Term of office of non-official members.** 5. The term of office of non-official members of this Council shall be for a period of three years,\* provided that a member shall cease to be a member of the Advisory Council when he ceases to be a member of the body which he represents ; a new election shall be held by each new Legislative Council at its first session, and, at the same time, other bodies shall be required to make their nominations

**Meetings** 6. There will be at least 2 ordinary meetings yearly, at Lucknow Allahabad, Naini Tal or Roorkee as fixed by the President, but the Council may hold any other meetings whenever it appears desirable to do so, at any station fixed by the President.

**Notice.** 7. Notice of the time and place of meeting will be issued to each member by the Secretary at least 6 weeks in advance.

**Quorum.** 8. Four members of the Council, exclusive of the Principal who must always be present, shall constitute a quorum.

*Notes.*—Should the quorum fail and should the president consider the meeting as constituted specially competent to discuss the issue in point, the proceedings shall go forward, the opinion of the other members being subsequently obtained by circular.

**Urgent cases.** 9. The Secretary of the Council may in urgent and other cases, submit matters for the opinion of the Council by correspondence.

**Disposal of Proceedings.** 10. The proceedings of the Council after approval will be printed and six copies sent to the Local Government and one copy to each member, a verified copy of each paragraph of the proceedings being sent to the Local Government separately for orders.

**Experts and Sub-Committees.** 11. The Council is authorised to call in experts for the consideration of any question on which experts' advice is required, and to recommend the appointment of Sub-Committees to deal with particular questions or with special branches of the work of the College. Before consulting any expert whom it is proposed to remunerate for his advice, the Council should obtain the sanction of Government to the payment of such remuneration.

**Allowances.** 12. The official members when attending meetings will draw travelling allowance under the rules. The non-official members will each be paid the ordinary travelling and daily allowance admissible to an officer of the first class. Non-official members elected by the United Provinces Legislative Council as their representatives on the council are entitled for attending meetings of the College Council to travelling allowance and also the daily allowance of Rs. 10 on the terms ordinarily admissible to members of the Legislative Council.

**Visits of inspection.** 13. It is expected of members that they will from time to time pay personal visits of inspection to the College and thus keep in touch with its circumstances, its work and its needs and aspirations.



# RULES OF THE COLLEGE BOARD OF STUDIES.

*Approved by Government.*

1. The members of the Board will include the Principal, all Professors of the College and the Assistant Professor of Mechanical Engineering. The Principal will be *ex-officio* President.

2. The meetings of the Board will be convened by order of the President.

3. The Secretary will be elected from among the members of the Board.

4. The Secretary will circulate, before each meeting, a copy of the Agenda, together with the necessary papers relating to subjects entered for discussion.

5. Any member, with the previous sanction of the President, may bring forward for discussion any subject of an Academic nature pertaining to the College work.

6. The Board of Studies will be an Advisory Body; it will not, exercise any control over discipline, but, in consultation with the President, will assist him in.

(a) the moderation of examination papers for the College final and sessional examinations ;

(b) the scrutiny of the sessional pass lists, and the award of grace marks under the procedure laid down for their allotment by Government order ;

(c) the allotment of marks for "General Fitness," except the marks awarded by the medical officer and those for Athletics, Games and Military training ;

(d) the preparation or revision of all time tables, syllabuses, and courses of study for the College.

7. The President, at his discretion, may at any time consult the Board on any other subject affecting the College work.

8. The minutes of each meeting will be recorded by the Secretary, and read and confirmed at the following meeting.



# STANDING ORDERS OF THE THOMASON CIVIL ENGINEERING COLLEGE, ROORKEE.

1929-30.

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## *General Rules.*

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1. Students on arrival will report as follows :

All students of the Civil Engineer Class, to the Personal Assistant to the Principal ; other students, to the Superintendent of Overseer Class Hostels, who will allot them quarters.

2. Each student will be responsible for the state of the quarters allotted to him, and will be charged for the repair of any damage which they may sustain beyond fair and unavoidable wear and tear. Accidental injury or disrepair should be immediately brought to the notice of the Officer-in-charge of the Class concerned with a view to its rectification.

3. No visitors, other than students of the Class to which the occupier belongs, are to enter students' quarters without the sanction of the Principal.

4. Furniture, at a nominal rent will, as far as possible, be provided for students of the Civil Engineer Class for use in the hostels, and damage to the same will be assessed by the Personal Assistant to the Principal. Such furniture is not to be removed from the rooms, or used for the Project or Triangulation Camps without permission [see Project Regulations 52 (16) ]. Special furniture will be provided for Project Camps. Students of classes, other than the Civil Engineer Class, will make their own arrangements for furniture.

5. All students will engage their own servants. To prevent men of known bad character being employed as servants, students are required to bring before the Personal Assistant to the Principal, or their Superintendent, for sanction and registration, all men they may wish to engage as servants. Men of unsatisfactory character are entered as such in the College register, and must not be employed as servants by any person residing in the College lines. No person,

except College or registered servants, or approved guests, will be allowed to live in the hostels or servants quarters or to enter them after nightfall. The Personal Assistant to the Principal will afford every assistance to students in obtaining servants at suitable wages on application being made to him. The wages of private servants must be paid by the 10th of the month following that for which they are due.

6. All information as to Text-Books, Courses of Study, dates of examinations, attendances, etc., will be found in the College Calendar and the Course of Study pamphlet.

7. All necessary books can be obtained at the College Book Depot between the hours of 11 A.M. and 1 P.M.

8. Students are reminded that this is a College for young men and not a school for boys. Though all needful assistance will be given to those really anxious to work, it is entirely on their own exertions that their success must depend; and in cases of failure, they will only have themselves to blame. They are, however, specially warned against idleness in their First year under the expectation that they can pick up in the Second or Third. The course is so laid out that continuous application is required for the whole time. Students are reminded that if they fail to make sufficient progress in their studies, they are liable to be suspended or removed from the College at any time.

9. All students will attend at the College regularly for studies at the hours laid down in the Time-table, and for out-door duties at the time prescribed by the Officer in charge of their Class or their Professors, Lecturers, or Instructors. *No student may be absent from his quarters in the College lines without leave after 9 p.m. during the winter term, and 10 p.m. during the summer term, or before sunrise.* The punishment for breaking this rule will be of the severest description. To enable the authorities to check this rule no doors should be locked at the times specified above. Students are permitted to sleep immediately outside, and in front of, their quarters during the hot weather.

10. All smoking, spitting, whistling or making any loud noise in the College is strictly prohibited. Students should be careful to do nothing which may interrupt, or distract others at work.

11. No debts are allowed to be contracted. All articles purchased (except those supplied from the College Stores) must be paid for in

cash. Students are strictly cautioned against all irregularities in money matters. Flagrant cases, which tend to bring discredit on the College, will result in dismissal.

12. All dues from students, recovered by the College, whether payable to Government or to private funds, persons or bodies, must, for any month, be punctually discharged in full before the 21st of that month, failing which the students will be fined marks, suspended or removed at the discretion of the Principal.

13. The Principal and the Officers-in-charge of Classes will always be glad to give any help and advice in their power, and students are earnestly requested to apply to one or the other in any case where they are in doubt as to the right course, before taking action. Students should consult the Officers-in-charge of their Classes for advice before referring the case to the Principal.

14. Any case of personal violence by one student to another, or by a student to any other person, will be punished severely. A student is never to take the law into his own hands, but is to report any grievance direct to the Officer-in-charge of his Class for enquiry.

15. Students wishing to see the Principal should apply for permission through the Officer-in-charge of their Class. Direct application to the Principal is contrary to orders. Petitions signed by a number of students are not allowed. Any matter affecting a class, or a number of students, should be brought to notice by the senior student concerned.

16. Students are strongly recommended to take a fair amount of bodily exercise regularly; too much poring over books is very apt to muddle the brain, and the active duties of the Engineering profession require a man to be as well trained physically as mentally to enable him to discharge them properly.

17. The Library is open daily at the hours specified in para. 68. Students are invited to avail themselves of it. The periodicals and papers placed on the Reading Room table for general use are not to be removed from the room. Loud talking in the Library or Reading Room is strictly prohibited.

18. No spirituous or fermented liquors are to be brought into the College lines, except as supplied under the usual regulations and authorized by the Principal. Aerated waters are manufactured under



careful supervision at the College Stores, and students should avoid purchasing aerated waters elsewhere.

19. Every instance of intemperance will be punished by immediate dismissal from the College.

20. Making use of fire-arms within the station limits is strictly prohibited. Students will not be permitted, even though in possession of a license, to bring fire-arms into their quarters without the permission of the Principal.

21. Students may keep dogs, but they must not be left loose if unattended. Dogs must invariably be chained up at night. All dogs must be registered and numbered in a register kept by the Personal Assistant to the Principal and must wear a collar and a special badge. Any dog found within the lines without a collar and badge is liable to be shot. The Personal Assistant will supply the necessary badges on payment. These badges may be returned at any time when not needed and payment will be refunded.

22. Dancing, singing parties, and the playing of musical instruments in the open, are not allowed without the special sanction of the Principal in every case.

23. Students are warned to be very careful to have their quarters securely locked when they are absent from them. Any case of theft of the property of a student or of Government must be reported immediately to the Officer-in-charge of the Class to ensure prompt and effective investigation. If after College hours, the theft should be reported to the Hostel Superintendent who will take immediate action and also report to the Officer-in-charge of the Class.

24. All students are expected at all times to be dressed in a neat and tidy manner, whether in or out of Class, and must not appear at Class in flannels or shorts used for games without special permission.

25. Only such plates and note books as are specially sanctioned by the Principal will be returned to students. These plates and note-books are on no account to be given to other students studying in the College. Students should bear in mind that this is a competitive College, and that any means tending to give any one student an unfair advantage must render the competition unequal and in time reduce the value of certificates granted and affect the good name of the College. Any breach of this rule will be severely dealt with.

26. Private servants are not allowed to enter the Class rooms. Drawing boards, etc., should be taken from, and made over to, servants in the verandah by the student to whom they belong. Private servants are not allowed to loiter in the verandahs of the College and students are expected to see that this rule is enforced.

27. Students must occupy seats at the numbered tables in the order of their standing in the class. Particular care should be taken not to splash ink on the tables, walls or floors, or to deface the furniture of Class rooms and Lecture rooms in any way by writing or cutting.

28. Students wishing to have baggage or parcels brought to the College from the Railway Station should give notice to the Personal Assistant to the Principal, before 2 P.M. on the day the goods arrive. This notice should be in writing, giving the number of their quarters, and a detail of the baggage or parcel. The railway receipt, signed, and the amount due for railway carriage, should be sent with the notice.

29. All students, on meeting the Principal, or any of the staff of the College, will salute them in a respectful manner. All students will address members of the College teaching staff as "Sir" when on duty.

30. In any Class the student standing first in order of merit will be the senior. The senior of a Class is responsible that any unusual occurrences or circumstances connected with his Class are promptly reported to the Officer-in-charge of the Class. He will take charge of Survey parties and arrange all details in camp.

31. All students must vacate College quarters during the Vacation.

32. Fruit on trees in the College lines is not to be plucked by students or their servants.

33. Three guest rooms, one European, one Mahomedan and one Hindu, are available for the use of the relatives of students on application to the Personal Assistant to the Principal.

34. Students are not allowed to be members of societies, nor are they allowed to join in discussions on public matters.

35. Students of the Civil Engineer Class, who gain a period of practical training, are prohibited from attempting to obtain either premature information of their posting to guaranteed appointments and apprenticeships gained by them or consideration of their claims to be

posted to the Provinces and Branches selected by them, from the Government of India Secretariat or a local Government Secretariat.

36. Students are expressly forbidden to approach Examiners, whether internal or external, with enquiries concerning marks, prior to their publication; and students are hereby warned that any such enquiries will be dealt with as a serious breach of the College Rules.

36A. Students will not be permitted to appear for any external examination during their College course except to complete an University examination incompleated through sickness prior to their admission.

37. The attendance of all students at the College Sports and Regatta is compulsory.

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### LEAVE.

38. Students must not leave the station without sanction. Application for leave must be, in all cases, first submitted to the Officer-in-charge of the Class concerned, who will submit the application to the Principal, except for such leave as is covered by recognized public holidays when the Officer-in-charge of the Class is authorized to sanction such leave. If the leave is sanctioned, in the case of the Engineer Class, the address whilst on leave will be noted by the Officer-in-charge and the application returned to the student, who will report his departure and arrival and also his address while on leave, to the Hostel Superintendent in a book kept by him for that purpose.

In the case of all other students, the leave application, after being signed by the Officer-in-charge of the Class, will be forwarded to the Principal for sanction (except as noted above), and returned through the Officer-in-charge of the Class to the Officer-in-charge of the Hostel of the applicant, to whom all reports of departure and arrival must be made. *Under ordinary circumstances applications for leave must be submitted before noon on the day previous to that on which leave is required*; an application for leave, submitted after this time, should only be recommended by the Officer-in-charge of the Class under very special circumstances regarding which the student has produced due evidence.

39. When the period of leave includes any attendances in College, the leave application must be initialled as approved by the staff con-

cerned. It should then be submitted to the Officer-in-charge of the Class.

40. Students are warned that absence without leave is a serious breach of rules. The senior student present in a room at the first attendance of the day is bound to report at once to his Supervising Officer the absence without leave or sickness of any member of the room.

41. To obtain leave and proceed on short leave, and then to ask for an extension, *except on the most urgent grounds*, is a practice considered highly objectionable in Government service, and the College authorities take the same view. The mere despatch of an application for extension is no excuse for failure to return on the proper date. A sanction to the extension by the Principal is necessary, and to obtain this each application should be accompanied by a stamped addressed envelope, and all telegrams are to be prepaid. These should be despatched to the Principal early enough for the applicant to receive a reply in time. *If no reply is received the application for extension should be considered as refused.* Students who, being on leave, fail to return to the College on the day on which the leave expires without receiving sanction to an extension, will be considered guilty of disobedience of orders and will be punished accordingly.

42. Students on return from leave must report themselves at once to their Hostel Superintendent.

43. Students requiring leave will apply on the forms provided for the purpose, which can be obtained from the Book Depôt, but students are not required to apply for leave to enjoy sanctioned holidays in the station or for the Vacation out of the station. No leave will be given to attend the weddings of relatives.

44. Banya's, tailor's, shoemaker's, baker's, and sweetmeat seller's shops are established in the College bazaar buildings for the benefit of students and are under College supervision. It is desirable that students should patronize these shops rather than purchase elsewhere.

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### SICKNESS.

45. The College Medical Officer will attend at the College Hospital daily at 6-30 A.M. from the 15th February to the 15th September, and at 8 A.M. from the 16th September to the 14th February. All students, who require medical attendance, must present themselves at

the proper hour for treatment. Those who are too ill to attend personally must send a notice to the College Medical Officer at this hour, who will visit them in their quarters. This is, however, only to be done in really serious cases. At 10 A.M. the morning statement is sent to the Principal, and any case of sickness after this hour will be treated as emergent. In emergent cases the College Medical Officer (who lives in No. 10 College Bungalow) will be always available and should be sent for at once.

46. If any student falls sick after the hospital hour, and is compelled to absent himself from class attendance on that account, or if during College hours obtains permission to leave on account of sickness, he must at once report to the College Medical Officer in all cases. He is required to attend hospital next morning, and the College Medical Officer will note on the Sick Report at what time the notice of sickness was received.

47. A student placed on the sick list will remain on the sick list till taken off by the College Medical Officer. He will report daily at the hospital at the specified hour while on the sick list, unless specially exempted by that officer. Students on the sick list excused from work or attendance at College are not permitted to leave their quarters, except for medical purposes, without the written authority of the College Medical Officer, initialled by the Principal. On the written application of the College Medical Officer, the Personal Assistant to the Principal is authorised to erect a necessary tent near the quarters of any sick student.

48. Students who have been frequently sick during the year will lose marks for physical fitness.

49. All Indian servants belonging to the College or to students, who require medical treatment, should attend at the hospital at the authorized hour.

50. No student may be treated privately. All cases of sickness must be reported and entered on the Sick Report. Any student concealing a case of sickness will be severely dealt with.

51. The College Medical Officer will visit the hostels, cook-houses, latrines, and grounds once a week to see that the sanitary arrangements are properly carried out, and will send a report every Monday morning to the Principal concerning any defects he may observe, or any improvements that he may wish to suggest.

**EXAMINATIONS.**

52. *The work given in by students at examinations, Projects, or at any time during the course, is accepted as their own honest and unaided work; any attempt to deceive the staff about it in any way whatever, will, on detection, be punished by immediate expulsion. No excuse whatever will be accepted.*

53. Any student not present at any examination from whatever cause will lose all marks for the same.

54. Valuing the answers to an examination is a very tedious and difficult matter, and each slovenly set of answers wastes time and temper, and causes all to suffer. The following rules which are all really in favour of honest, regular men, will be strictly enforced, and marks deducted in each case in which they are infringed or not acted up to.

(I). Carefully read and minutely adhere to the instructions printed on the cover of the books issued to students to write their answers in. These instructions are as follows:—

- (1). Number your answers to correspond with the numbers of the questions, and if the question is divided into sub-heads be careful to number these also.
- (2). No part of this book is to be torn off.
- (3). The whole of the work, including all rough work, is to be written in this book.
- (4). No writing whatever is allowed on any other paper, except squared paper when required for an answer. Each sheet of squared paper must be headed as required under Regulations (III).
- (5). The paper should be ruled, or folded, so as to mark a margin on the left-hand side. This margin may be narrow when no rough work is required, but should be a third of the width of the paper when rough work is needed.
- (6). The hand-writing should be distinct.
- (7). Both sides of the paper should be written upon.
- (8). In the event of this book becoming filled up, another book must be used and the number used written below. There is a tendency amongst students to waste their own and the examiner's time by writing unnecessarily lengthy answers, by needless repetition,

and by using a large number of answer books. *One* answer book should generally suffice. All answers should be as concise as possible, and, if sufficient thought is exercised before the answer is committed to paper, all repetition can be avoided. Careless and lengthy answers will entail a loss of marks.

- (9). These books are not to be folded but forwarded flat, and if more than one book is used by the same student the second and succeeding books must be placed, *inside the first.*
- (10). Students with roll numbers using this book, are not to make any allusion to their names or initials, or to make any marks by which they may be identified.
- (11). Fill in the index on the next page.
- (II) The index on the inside of the cover of the book should be carefully filled in. Students must fill in against each question attempted the word "answered." In the case of questions having separate parts (a), (b), (c), each separate part attempted should be indexed as "answered." Nothing should be entered against questions which have not been attempted.
- (III). In final examinations the student will be given a roll number to use instead of his name. This must be put in the right-hand top corner of *each* book. The number of the question should be put at the top of the centre of each sheet
- (IV). The examiner will mark under three heads:—
  - (1). Knowledge of the subjects.
  - (2). Accuracy in working.
  - (3). Clearness of working and expression.

If the student fails in (IV) (3), even though perfect in (1) and (2) he will lose marks. He is bound to show clearly how he obtained his results, and the Examiner has no time to waste to wade through slovenly work or roundabout methods.

Take a mathematical examination for example:—

- (a). Each process should be headed with a word or two of explanation.

- (b). All work having to be done in the book, each step or calculation that cannot be done in the head must be done in the margin with a mark for reference.
- (c). All work known to be useless must be scored out.
- (d). The answer must be plainly marked. Write the word "answer" opposite the answer in each case; thus  $x =$  answer.
- (V). Students must bring their own pens, inks, pencils and drawing instruments and the use of slide rules may be permitted at the discretion of the Examiner. No borrowing from each other is allowed during an examination.
- (VI). No books or papers of any sort are to be brought into the examination room; Logarithm tables, graph, and drawing paper when necessary, will be provided.
- (VII). No student may leave his seat for any reason except to quit the room. After having once left the room, for any reason whatever, he cannot return. A student wanting another book will call an attendant who will bring it to him.
- (VIII). When time is up the Examiner will call out "cease writing," after which order pen must not be put to paper for any purpose whatever.
- (IX). The use of red ink or of coloured pencils should be avoided when possible, as the Examiner usually makes corrections in red ink or blue.

### PROJECT REGULATIONS (INCLUDING TOURS).

*Notes for the guidance of students in drawing up Projects.*

55. (1). *The collaboration of students during Projects is forbidden, and in this connection attention is expressly drawn to Standing Order No. 52 and to the penalty for its infringement. It must be remembered that Projects are competitive examinations subject to the ordinary examination rules. Students are warned that they are allowed to obtain assistance solely from (a) technical books in general, (b) plans and models in the Model Room and Library, (c) plans of any existing engineering work which they may obtain from a source which is equally open to other students of their year.\**

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\* *Vide* Standing Order No 55. Such plans should in any case be shown to the Prof. C. E.



*It is forbidden to obtain survey maps or level charts from outside sources, or any assistance in designing or calculating from outside the College. Students are not permitted to obtain previous engineering projects executed by past students for the purpose of assisting them in their work. Finally, in the absence of specific Project regulations, the best guide to a student's conduct is his own sense of honour.*

(2). A Project is expected to be a piece of work such that a senior officer can examine, criticise, pass orders on it, and hand it over for execution. To ensure this result it must be complete in every sense. It must include a clear concise report with *cross references* to all drawings; a survey which can be checked with ease and celerity, and drawings from which work or working drawings can be produced and from which the estimate can be checked. The drawings must be neat, but should have no unnecessary elaboration. Calculations should be given for all important structural items. A student must carefully think out his work. Having gone over the ground he should scheme out his survey. To ensure that he has time to submit all necessary work, all work in the field must be done neatly and methodically.

(3). Having completed the field work the student is required to complete his Project in the College. Work in quarters is not permitted on plates, but this does not prevent a student from thinking out his designs, and making sketches and calculations in his spare time. He must again map out a methodical scheme if he is to submit a complete Project. Every plate should be numbered, with a heading showing what the plate represents. A scale should be noted down for each drawing and sufficient dimensions should be given both for the estimate and for actual work. References to conventional signs need only be shown on one sheet for the whole Project.

(4). Above all the student should endeavour to show a sense of proportion as regards the relative importance of the various portions of his work. The whole of such details as galvanised or tile roofs, railings, gateways, etc., should not be drawn but only sufficient to show the style proposed. All calculations for applied mechanics should be fastened together and full references given in the text to all plates. All details necessary to check the calculation should be given. All calculations referring to a particular design should run concurrently, and be prefaced by a clear statement of the data connected with that design. No calculations should be shown on the plates, but the

magnitudes of the forces represented should be clearly shown. No marks will be allotted for applied mechanics plates which are not accompanied by calculations in the report. The important details in drawing, the finished survey, estimate, calculations and report should all be completed first. Cross references and headings should be carefully given so that it may be easy to follow from the report or estimate what is being referred to. Any leisure time can then, if desired, be devoted to type drawings of well-known details and to generally beautifying, cleaning, and elaborating the plates. The cleaning of plates by servants or menials is forbidden.

(5). **Discipline and Sanitation.**—The senior student is responsible for the discipline of the camp. He will at once report any authenticated case of a breach of the camp regulations, and pending the arrival of instructions from the Officer-in-charge of the Civil Engineer Class he is empowered to issue such instructions to students or to khalassies as he may consider necessary.

(6). Until a student has finally completed his field work in camp he is not permitted to visit Roorkee unless specially authorised to do so by the Officer-in-charge of the Civil Engineer Class. If a student, on account of absolutely imperative circumstances, desires to visit Roorkee on leave from the Project camp, he must submit a written application for leave at least 24 hours before he desires to quit the camp, and he is not authorised to proceed on leave until he has received the necessary permission. Such leave will only be granted in very exceptional cases and on receipt of conclusive evidence that it is absolutely necessary.

(7). Students are not compelled to work on Sundays or on College general holidays, but they are allowed to do so. No extension of time in camp or in College will be given to such students as observe these days as holidays. No work, however, is permitted in the College on Sundays after the return from camp, though such days may be utilised, of course, for work which is permitted in quarters.

(8). All students while in camp are to keep a diary showing each day the hour of leaving camp and the hour of return, the nature and extent of the survey or other work executed giving the names of any villages or other prominent points visited, and any other concise information useful to an examiner in checking the progress of the work. *The diary must always be on the person of the student so that*

it can be produced at once when demanded, and it must be kept up to date and must be written in ink.

(9). Students should leave camp for work not later than 8-0 A.M. daily.

(10). Every endeavour should be made to avoid giving offence to villagers near the camp or elsewhere by needless destruction of crops or by other such damage. Pea-fowl must not be shot without permission from the local villagers.

11. Every camping ground is to be kept clean. The second senior student will be responsible for the supervision of sanitation under the direction of the senior student. Paper, etc., must not be left lying about. Fires are not to be lighted outside the limits of the camp or near tents. Tins of oil are not to be kept in Government tents. Lamps must not be placed on tables where there is a danger of the tent catching fire. Before a storm all lamps must be extinguished.

(12). Necessary tents should be located on the side of the camp away from the direction from which the prevailing wind blows, and should be if possible 100 yards or more from the camp.

(13). The purity of the water-supply for drinking and cooking should be carefully ensured. Drinking water should be boiled before use. The washing of clothes should not be permitted near a well from which the supply of drinking water is drawn, and in the case of a stream the washing of clothes must take place down-stream of the drinking water site.

(14). After return to the College students should note that no work in their quarters is permitted during the hours of the usual College attendances. Project work is permitted in the College before or after the College attendances as well as during them up to 6 P.M. For the last fortnight of the Project, if in the month of May, electric fans will work till 6 P.M. in the 3rd year class room.

(15). Students will be responsible for their drawings and original survey records which are, on no account, to be taken to their quarters, but which must be kept filed in their class room in the almirah set aside for this purpose. The issuing officer will stamp all paper issued, and each sheet must be immediately signed by the student to whom it is issued.

(16). **Tents, Conveyance, etc.**—Government tents are classified as follows :—

E.P. tents to accommodate four students.....Class I.

Semi-Swiss Cottage, large, two students.....Class II.

„ „ „ „ small, one student.....Class III.

*Shuldaries*, large, to accommodate not less than 15 khalassies.

„ small, „ „ „ „ „ 8 „

As the majority of the class consists of Indians, they will be accommodated in batches of 4 each in E.P. tents. If there are 3 Mahomedans they will occupy one E.P. tent, but 2 Mahomedans will be accommodated in a Class II tent.

For example, if the class consists of—

*Case I.*—13 Hindus and 3 Mahomedans. Then the tents will be allotted as follows :—3 tents Class I, 1 tent Class III for the Hindus, and 1 tent Class I for the Mahomedans.

*Case II.*—14 Hindus and 2 Mahomedans. 3 tents Class I and 2 tents Class II.

In the case of Europeans, tents of Classes II and III will be available according to the above scale.

There will be one E. P. tent, with drugget, for the Indian Engineer Class Club, and one single pole tent each, with drugget, for the European and Mahomedan messes. provided that each has three or more members.

Necessary tents are for Indians only.

*Furniture.*—Each student will be allowed 1 bed, 1 mattress, 1 folding chair and 1 folding table (the latter two being camp furniture). Club and Mess tents will have collapsible tables.

(17). One cart per two students will be sanctioned and an allowance of two annas per mile per student be given to and from the Project camp; over and above this, students must make their own arrangements. If the Personal Assistant to the Principal is required to obtain carts, etc., three days' notice must be given in writing. For a journey which is made partly by rail and partly by road a student will be allowed the price of one and a half 2nd Class fares, and 8 annas a mile by road, for the journey to and from the Project Camp. The distance from the College to Roorkee station is  $1\frac{1}{2}$  miles. No other travelling charges are admissible.

(18). Two dâk coolies for the camp, one of whom will report daily to the senior student, will be allowed, provided the camp is within a 15-mile limit, and three dâk coolies for a 20-mile limit.

(19). An allowance of Re. 1 per mile is sanctioned to each student for the cost of flags, pegs, etc., subject to a maximum of Rs. 10. No other contingency charges are admissible, and this also includes such items as stationery, portfolios, etc.

(20). Students who are unable to finance themselves can, on applying in writing to the Principal, receive an advance up to Rs. 50 for payment to khalassies. This sum will be deducted from the total of the bill on the close of the Project. The success with which students manage their coolies and make their camping arrangements will be considered in awarding marks for "Fitness for Department."

(21). **Survey—Care of instruments, khalassies, etc.**—One theodolite, one level, two levelling staves and one ordinary plane-table equipment will be issued to each student, each instrument bearing the class number of the student. The student will be personally responsible for these instruments being in adjustment and in good working order. Any damage sustained will be made good by the student, and he will not be permitted to exchange his instrument or stand with another student, and no student will be permitted to lend his instrument. The damaged instrument with a report must be sent immediately to headquarters.

Students will always accompany their khalassies proceeding to and returning from work. In inclement weather instruments should be put away in their boxes and the boxes protected from rain, sun and dust. When an instrument is kept standing for some time in the sun, the cloth bag should be placed over it for protection. Level staves should be clamped together when not in use, and they should not be leant against walls and trees, but placed horizontally on the ground and protected from dew, rain and white ants.

(22). Except level staves, plane-table stands and chains, no instrument should be carried on carts. The khalassies *must* be utilised for conveying such instruments to the field and back to headquarters. Plane-tables may be placed face to face and taken in a spring cart, but this only when the student himself is travelling with them. With reference to the use and care of instruments students should read paras. 71 and 154, Survey Manual, Part I.

(23). The boundaries of all fields must be surveyed provided they come within the specified limits of the alignment, submerged area, etc. Village boundaries must also be defined; these are usually shown on the guide map or index map issued. Traverse work and triangulation must be based on true north, and the magnetic variation at the time should be clearly noted on each map and drawing. Every use should be made of embedded stones, plinths of building, etc., as bench-marks in levelling even if such objects are to some extent without the limits of the work.

(24). Plane-table sections, note-books, etc., must have the name and number of the student clearly written on them. All plane-table sections and records must be kept up to date in ink, and index and cross reference work should be made in the field. Level and Traverse Field-books must be recorded in ink in the field.

(25). If a chain is used the chain should be checked daily and the chain error noted in the field-book. Levels should be tested for adjustment daily, *vide* para. 79, Survey Manual, Part. I.

(26). All calculations for curves, azimuths, etc., should be contained in the Survey note-book.

(27). Students will see that as little damage as possible is inflicted on standing crops, and if chaining is necessary through such crops the chain should be lifted, *not dragged*, from arrow to arrow. The instrument should be set up as near as possible to the line of demarcation between fields to avoid repeated tramping down of wheat, gram, etc.

(28). Khalassies will be enlisted at Roorkee, and they will ordinarily be entitled to one day's leave per week if the Project is within 12 miles of Roorkee, or two days in a fortnight if beyond that limit. The day or days for leave is one for the student to arrange. Khalassies will receive pay at the prevailing rates for labour, and tindals or chainmen (one per squad of 3 men) will, if recommended, receive pay at the rate of Re. 1 extra per mensem. Each khalassie can obtain a record sheet which will entitle him to prior claim for enlistment for both the Triangulation and Project camps. A chainman or tindal on a higher rate of pay loses claim to the extra allowance, if he absents himself from any of the above camps. A student engaged on independent work will, if circumstances allow, have a squad of 5 men. He will not be permitted to work with more.

(29). **Tours.**—When proceeding on a tour each student will be allowed the price of one 2nd class railway fare for any journey by rail, and he will make his own arrangements, on this sum, for the transport of his personal kit and servants. Each student will also be allowed Re. 1 per diem for carriage expenses and Rs. 3 per night if detained in a town while on tour.

## WORKSHOP RULES.

56. The punctual attendance of students at Workshop hours is essential.

*Workshop Tickets.*—Every student attending the Workshop course will be allotted a special number. On entering the shop every day he will be given a corresponding ticket. He will make the ticket over to the Foreman Instructor on getting his tools, and receive it back when he has returned his tools correct at the close of the day's work.

Work should be carried on until the closing hour has sounded, when tools should be cleaned, put away neatly in the proper place, and counted over to the Foreman. On leaving the shops students will give up their tickets at the gate.

57. Each student on joining the shops will provide himself with the following tools:—

1 steel L-square.	1 outside callipers.
1 12-inch steel rule.	1 wing compass.
1 inside callipers.	

He will bring these tools each day he attends the Workshops during the course.

58. At the Workshops students will be under all the College rules as regards conduct. Smoking is strictly prohibited.

59. Breakages and injuries to tools, machines and Government property generally must, in all cases be reported at once to the Lecturer in charge.

60. Materials for instructional work will be issued to students by the Foreman with instructions regarding the work to be done. On completion of the work it must be shown to the Lecturer and approved before a more advanced exercise can be given. Students are warned that the practice of inserting wood chips and shavings in a carpentry joint in order to make the joint tight will entail the loss of all marks for that particular exercise.

61. Students are prohibited from working at any machine, unless specially authorised in this respect by the Lecturer in charge or the Foreman of the Shop.

62. Loose clothing and *puggies* may not be worn in the Workshops.

63. Students must not enter any shop other than that in which their class is working, without permission from the Lecturer in charge.

64. *Rules regarding student's independent work in the College shops.*

- (1). Every student wishing to do private work must first bring to the Lecturer in charge, to be kept by him, a fully dimensioned sketch showing clearly the article he wishes to make: the student should also possess a copy for his own use. If sanctioned by the Lecturer, the job will be given a Workshop number and material issued for it. If the student wishes to make any alteration in the original design a fresh drawing must be made, and sanctioned by the Lecturer in charge.
- (2). All articles being made, and the materials issued, must on no account be removed from the Workshop by students, but must be left in charge of the Shop Foreman: when any article is complete it must be handed over to the Lecturer in charge, and if proved satisfactory after examination by him, it will be issued to the student who made it.
- (3). No articles made by students in the College Workshop may be sold without the Principal's sanction.
- (4). Students can get advice and assistance in their private work from the Lecturer in charge and the Shop Foreman, but they are held responsible that no assistance is given by workmen or others, except those noted above.
- (5). Students who have made specially good progress in their work in College in any special subject, will be allowed to obtain the permission of the Professor or Lecturer in that subject to devote a definite number of the attendances laid down for that subject to independent work in the Shops.
- (6). Private work must not be done during hours allotted to Workshop Practice.



**LABORATORY RULES.***General.***65. Laboratory rules.**

- (1). The greatest care must be taken in handling and using all apparatus; any breakage or damage which occurs must be reported at once to the Professor or Lecturer. Any damage or loss resulting from carelessness will be charged to the student or students responsible for it. This rule also applies to all survey instruments.
- (2). After finishing any experiment, all parts of apparatus and reagent bottles used must be replaced at once in their proper positions before leaving the laboratory, the whole apparatus being replaced in its case if such is supplied. In using boxes of weights especially, it must be carefully noticed that every weight is properly replaced.
- (3). In working, the benches must be kept as clean as possible; students being careful to avoid any unnecessary dirt or mess.
- (4). Students must enter in a laboratory note-book specially kept for the purpose details of each experiment performed by them during or immediately after its completion. Such rough notes must be recopied, kept up to date, and be always ready for inspection when called for. In the Physical and Electrical Laboratories, after finishing an experiment, students must mark it off on the form put up in the laboratory for the purpose.
- (5). Students must do all experimental work entirely independently; all necessary explanations, etc., will be given by the Professor or Lecturer. Consultation between students is strictly forbidden during experimental work except when two or more students are told off together to conduct an experiment.
- (6). All apparatus, chemicals, etc., are supplied free to students; but any breakage or damage will be charged to the student or students responsible for it.
- (7). *Violation of any of the Laboratory rules will be punished by loss of marks.*

*Chemical Laboratory rules.*

- (8). Each student must provide himself with a rough note-book, a piece of platinum wire, a duster, padlock and key, and a copy of each of the prescribed text-books. Keys of the padlocks should be labelled, and left with the Lecturer.
- (9). The sinks, benches, floor, and apparatus must be kept clean ; all unnecessary dirt and mess is to be scrupulously avoided.
- (10). Students should be careful not to waste chemicals, either by spilling them about, or by using unnecessarily large quantities.
- (11). All experiments giving rise to poisonous or obnoxious fumes must be performed in the fume chambers.
- (12). Students are advised, when heating either solids or liquids in test-tubes, to direct the mouths of the tubes towards the reagent shelves, in order to prevent any accident occurring to their neighbours.
- (13). Students are on no account to touch the switches regulating the ventilation of the fume chambers.

*Laboratory Balance Room rules.*

- (14). Students, when weighing, should always place the article to be weighed on the scale pan on the *left*-hand side of the balance, and the weights on the *right*-hand side.
- (15). Chemicals are on no account to be placed directly upon the scale pans. Chemicals to be weighed should be either put upon a watch-glass, or placed in a weighing bottle. All apparatus to be weighed should be *scrupulously clean, and perfectly dry*.
- (16). When weighing, the balance pans should be *slowly and carefully* released. The weights are *never* to be placed upon the scale pan while the balance pans are free to swing.
- (17). The weights are *on no account* to be touched with the fingers but should be removed by means of the callipers furnished with each box of weights.
- (18). During the process of weighing, the weights are to be removed, one by one, from the weight-box and *carefully* placed upon the balance pan. Weights must not be placed upon the top of each other.

- (19). Check the result of each weighing by adding together the weights removed from the weight-box ; then carefully remove weights from the balance pan.
- (20). All weighings must be carefully recorded in a note-book and not on scraps of paper which are liable to be lost.
- (21). Students, when they have finished weighing, should remove the rider from the beam of the balance, see that the balance pans are not free to swing, close the balance, replace the balance cover, and see that all the weights are correctly placed in the weight-box.
- (22). Hot crucibles are *on no account* to be put upon the balance pans. Crucibles should first be allowed to cool in a desiccator.
- (23). Apparatus should *not* be left upon the balance tables.
- (24). Should any of the balances be defective, the matter should be reported *at once* to the Professor or Lecturer.

*Engineering Laboratory rules.*

- (25). Preliminary to work in these Laboratories each student should become familiar with the operation and mechanism of the machine to be used.
- (26). The accuracy of the machines and instruments depending chiefly upon their correct adjustment, students are forbidden to tamper with them in any way.
- (27). Steam valves must never be opened except in the presence of the Lecturer. Serious accidents have happened in the past through non-observance of this rule.
- (28). In framing reports of tests, attention should be paid to clearness and order of statement, legibility of writing and neatness.
- (29). Reports of tests will be submitted on the day following that on which the test was made. The report, with any corrections, will be returned to the student, after checking, on the student's next attendance at the laboratory.

*Survey Laboratory Rule.*

- (30). The greatest care must be taken in handling and using all Survey instruments : any breakage or damage which occurs must be reported at once to the Professor or Lecturer. A

student is personally responsible for any instrument issued to him, and when kept by him in his quarters he should see that it is put in a safe place and not where it is likely to be knocked over by his servant in cleaning up the room. No instrument should be left unattended in the field. In going to, or returning from work in the field *students (except Civil Engineer Class, Third Year) must, on no account, hand their instruments over to servants to carry.* Any damage done to an instrument must be made good by the student to whom the instrument was issued, and, in the case where students are working in parties, the cost will be divided among the members of the party unless it can be shown clearly that one or other of the party was directly responsible for the damage done. In addition to having to pay for the damage caused, the student or students will have marks deducted either from their "Fitness for department" or "Survey" groups or from both.

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### COLLEGE OFFICE.

66. (1). Students are strictly prohibited from entering the College office rooms. Any work which they may have with the office should be transacted over the counters or by standing before the outer doors of the College office rooms.

(2). All payments by students for rent, fees, subscriptions, Stores bills, etc., must be made at the counter of the College Office between the hours of 10 A.M. to 1 P.M., and 2 P.M. to 3 P.M.

(3). The payment will be entered in a register kept by the Cashier. This entry will be initialled by the student at the time of payment, and this initial will signify that the entry is correct. No receipt will be given except for special reasons. Every payment must be made by the individual concerned in person.

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### COLLEGE BOOK DEPOT.

67. (1). Students are not permitted to cross the counter, or to touch any article in the Book Depot. The Curator will supply them with anything they may require.

(2). Smoking in the Book Depot is strictly prohibited (*see* rule 10).

(3). Books, etc., once issued from the Book Dépôt to students, will not be taken back or exchanged, except by special permission of the Principal.

(4). The deposits laid down in the Calendar must be paid into the College Treasury by students before books, etc., can be issued to them on credit.

(5). Articles will be issued to students from the Book Dépôt from 11 A.M. to 1 P.M., except on Mondays, Tuesdays, Thursdays, and Fridays in the 1st Term when they will be issued only from 1 P.M. to 2 P.M.

(6). A list of books, with prices against them, is hung in the Book Dépôt and is in the Circular of each class for the information of students. Students are, therefore, directed to pay the Curator the exact amount of the price of the book or books they want to purchase, as change is not always available in the Book Dépôt.

(7). Students are warned that in all dealings with the Curator they must comport themselves in a proper manner.

## COLLEGE LIBRARY RULES.

68. (1). Certain works of reference can only be consulted in the Library and Reading-room, and may not be removed from these rooms without special sanction from the Principal.

(2). No book will be issued on loan from the Library until a signed receipt for the same has been handed to the Librarian; this receipt will be returned when the book is given back.

(3). Books are liable to be recalled at any time by the Librarian.

(4). The transfer of books on loan is prohibited.

(5). Students making use of the Library are forbidden to remove books from the shelves. The Librarian on being informed of their catalogue number will supply any book required.

(6). The Library will be closed annually to the issue of books from the 5th to the 15th July. All books out on loan on the 5th of July must be returned before the 7th.

(7). Persons damaging or losing books will be charged with the value of the same. The practice of marking or scribbling in books, or of removing illustrations, is strictly prohibited [see also Rule 68 (11) footnote].

(8). Persons infringing these rules are liable to be denied the use of the Library.

(9). The Library is open daily during the College Session, Sundays and holidays excepted, for the issue and return of books from 11 A.M. to 12 noon and from 2 P.M. to 3 P.M. during the second term and during the same hours on Wednesdays and Saturdays throughout the session. On Mondays, Tuesdays, Thursdays and Fridays in the first term the Library is open from 11 A.M. to 4 P.M. but attendance at the Library should not be allowed to interfere with College attendances or work, and books must be returned or issued between 1 P.M. and 2 P.M. During the Vacation the Library is open on Thursdays from 11 A.M. to 1 P.M. The Reading-rooms are available for reference purposes during the College Session from 8 A.M. to 4 P.M. daily, except on Sundays and holidays.

(10). Class books, as shown in the College Calendar, are issued to students for a period not exceeding three months, but no other text-book on the Book Depôt list will be issued to students from the Library.

(11). In addition to Class books, students are entitled to keep books\* on loan up to the limit laid down for the different classes, but no book may be retained for a longer period than a fortnight.

(12). On return from the field work of the Project, till the completion of Project, the length of time during which a book may be retained by a member of the Third Year Engineer Class will be three days only. The re-issue of these books will only be made on the recommendation of the Professor of Civil Engineering.

(13). Applications from students for scientific works which have been issued will be registered by the Librarian, and on the return of the books they will be issued to the applicants in the order of priority of their applications.

(14). During the Vacation students will be permitted to take books on loan from the Library under rule (13) on obtaining special permission from the Principal. Application from students to the

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\* In future students taking books containing Plates from the Library must personally check the number of Plates and note it on the receipt; the Plates to be again checked when the book is returned.

Principal must be countersigned by the Officer-in-charge of the Class, and all such applications must be submitted by the 3rd July. No applications will be considered after that date. Applicants will attend at the Library immediately after the Convocation when they will receive their books if sanctioned. Only technical books will be issued and not more than three books of any one section to each student.

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### COLLEGE DAIRY

69. All European students are to obtain milk and butter from the College Dairy, and from no other source. This Dairy is maintained for the good of their health, and students are earnestly requested to see that their servants do not supply milk or butter from outside sources, and by this means endanger the health and even risk the lives of students. Any servant detected supplying milk or butter to European students from outside sources will be expelled from the College lines, and students will be held responsible that their servants are informed of this fact. Butter and milk may be paid for through the Dairy bills,

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### SUBSCRIPTION TO PRIVATE FUNDS.

70. (i). Students are required to subscribe the following donations at the beginning of each session to the Sports and Regatta Funds of the College :—

Engineer Class	...	...	Rs 3 a year.
Overseer Class	...	...	„ 1 „
Draftsman Class	...	...	As. 8 „

(ii). Students are required to join the various clubs of the College of their respective classes as specified below, with the rate of subscriptions at present in force.

#### *Civil Engineer Class.*

*Mess.*—For European and Anglo-Indian students.—Donation Rs. 10 a year from the first and second year students; subscription Rs. 15 a month, and messing charge of one rupee and six annas per diem during the Sessions. (*N.B.* The messing charge may be higher if the numbers are few).

*Club*—for Indian students—Donation Rs. 10 a year for the first and second year students ; and subscription Rs. 10 a month for first second and third year students, during the Sessions.

*Overseer Class.*

All students of the Overseer Class are eligible to join the Overseer Class Reading Club on payment of a monthly subscription of Annas 12 during their period of residence.

All Overseer Class students are expected to join the Overseer Class Recreation Club. A donation of Re. 1 is to be made by each student at the commencement of every session to the College Sports Fund. The subscription to the Overseer Class Recreation Club is fixed at Rupees 2 per mensem, per student, payable for nine months only. All the usual games will be available for Overseer Class students for this subscription excluding the use of boats.

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**SPECIAL RULES.**

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*Civil Engineer Class.*

71. All European students of this Class are expected to attend Divine service once every Sunday at their own place of worship.

72. Indian students will make their own arrangements for messing.

73. Students are not to enter Recreation Club Boats till they have qualified in swimming.

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**RULES FOR THE EUROPEAN C. E. CLASS STUDENTS' MESS.**

74. (I). This mess was established in January, 1869. All European Civil Engineer Class students must join it, except such as obtain special permission from the Principal to live with friends or relatives in Roorkee. Such permission is exceptional as it is desirable that all European students should have their meals in the Mess.



- (II). The management of the Mess is entrusted to a Committee composed of the Officer-in-charge, acting as President, and four students, two of whom shall be elected from the first year, one from the second year, and one from the third year students. As soon as possible after the commencement of the Session one of the Committee members shall be detailed to act as Mess Secretary, and shall be provided with quarters in the Mess.
- (III). A general Mess meeting can only be called with the consent of the Principal.
- (IV). The rates of subscription, etc., have been fixed as follows subject to alteration at the discretion of the President—  
*Entrance Donation.*—Rs. 20 (to be paid in two instalments, half on joining the College and half at the commencement of the Second Year's Course of Study).  
*Monthly Subscription* —About Rs. 15. *For details, see Circular.*  
*Messing.*—One rupee six annas per diem\* (including breakfast, lunch and dinner). The above items are charged in the monthly Mess Bill.
- (V). Liquor and extra English stores will be paid for monthly by cash payments, which must be settled before the 21st of the month following that to which they relate, excepting at the end of each Session, when the bills must be settled before the Mess is closed. Students are reminded that, at the end of the final Session, certificates are withheld from all students who have failed to settle all College accounts.
- (VI). The charge for messing must be settled (in the College Office) not later than the 21st of the month to which it relates. All extras are to be settled by the 21st of the following month, except in the last month of the term when all accounts must be settled before a student leaves the College. Students are reminded that any

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\* This rate may be increased if there are very few members in the Mess.

student in arrears with his account on the first day of each month will lose all marks for all examinations that may occur between that date and the day on which his account is settled (*vide* printed memo. on expenses).

- (VII). All regular members of the Mess will pay their daily messing whether they be present at the Mess or not, unless absent on duty, or for more than three days on account of sickness. Periods of leave over three days will be specially considered by the President.

*N.B.*—No exemption from payment can be admitted unless due notice has been given to the *Khansamah*.

- (VIII). Students who have permission to live with friends or relatives in Roorkee and do not make daily use of the Mess will pay the donation, but no monthly subscription, and they will pay for messing as follows :—For dinner, 12 annas ; lunch, 5 annas ; breakfast, 7 annas.\*

- (IX). Members inviting guests will pay for their messing at the rates fixed in Rule VIII ; also passed students who may make use of the Mess during a visit.

- (X). As dinner will only be provided for the number of regular dinners, any non-dining member wishing to dine, or a member who has invited a guest, must give proper notice before 2 o'clock on the day on which he wishes dinner to be provided. Such notice having been given cannot be withdrawn after 2 o'clock on the day referred to.

- (XI). No invitations to Mess parties or entertainments are to be issued in the name of the mess as a body without the sanction of the President. This does not preclude individual members from inviting private guests.

- (XII). The Mess property and furniture of every kind belongs to the College, and no individual member has any share in it.

- (XIII). Any damage done to Mess property must be reported to the Mess Secretary, who will bring the matter to the notice of the President with a view to assessment.

- (XIV). The Mess plate, crockery, and cutlery cannot be made use of by individual members outside the Mess, neither can provisions be taken from the Mess to students'

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\*These charges may be increased if there are very few members.

quarters excepting for members who have been reported sick by the medical officer. These members must send their own servants and crockery for what they require.

- (XV). The lending of Mess property for purposes of College entertainments, such as cricket, lunches, etc., and the granting of the services of the *Khansamah* or other Mess servants for any purpose whatever other than their proper employment in the Mess, is left to the discretion of the Mess President without whose sanction no Mess servant can be employed or Mess property used outside the Mess.
- (XVI). Stores for the Mess are to be ordered by the Secretary only, as occasion may arise, with the sanction of the Mess Committee, who are responsible that actual requirements are not exceeded. Any stores ordered from any place, except Messrs. Murray and Co., Roorkee, must have the special sanction of the Mess President. No stores may be purchased in the bazaar on any pretext whatever.
- (XVII). The following Mess servants will be regularly maintained, *viz.*, a *Khansamah*, a bearer, and a *khidmatgar*, sweeper and bhisti. The latter three will be on half-time employment at half wages. These wages will be discharged by the Mess together with other incidental expenses, such as lighting of rooms, washing of table linen, etc. No other expenses can be incurred without the sanction of the Mess Committee.
- (XVIII). Members must keep their own table servants at the rate of at least one *khidmatgar* to every two students. These private servants must be considered as under the orders of the *khansamah* during the time they are on the Mess premises, and will be expected to help generally with the table work.
- (XIX). Any one striking or ill treating a servant within the Mess premises is to be reported at once to the Mess President.
- (XX). No private servant or property may be kept permanently on the Mess premises without the special sanction of the President.

- (XXI). A book will be kept in which any complaints can be recorded by individual members. These will be attended to by the Mess Committee, but students should bear in mind, when making complaints, that the tariff has been fixed at the lowest rate possible. Any flagrant abuse of the privilege will result in the complaint book being removed.
- (XXII). Breakfast and dinner will only be provided at fixed hours to be notified by the Mess Committee. It is only by adhering strictly to this arrangement that a tariff as low as that fixed can be maintained.
- (XXIII). The senior student present will be held responsible for the preservation of order, and for bringing to the notice of the Committee any infraction of this rule.
- (XXIV). The Secretary is responsible for the cleanliness of the cook-house. He is to visit it daily and see—
- (1). That the cooking utensils are clean ;
  - (2). That clean *jharrans* are issued daily and the dirty ones taken back ;
  - (3). That no articles of food are kept in the living room attached to the cook-house ;
  - (4). That all work is done in the cook house and on the tables provided ;
  - (5). That any meat such as pork, bacon, liver, etc., which the Mess Secretary wishes inspected, is sent to the College Medical Officer who will stamp the meat, if good.
- The Mess Secretary is to report weekly to the Officer-in-charge that he has carried out these orders.
- (XXV). The Mess is not to be kept open later than 9 P.M. during the winter term and 10 P.M. during the summer term without special sanction from the President.

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### **RULES FOR THE INDIAN ENGINEER CLASS CLUB.**

75. (a). All Indian students who are eligible should subscribe to the Indian Engineer Class Club.

(b). The management of the club is entrusted to a Committee of Members, one of whom shall be elected Honorary Secretary. This Committee will be elected at a general meeting at the beginning of each year, subject to the approval of the President.

(c). The committee will draw up a list of rules for the management and welfare of the club, and make recommendations for expenditure.

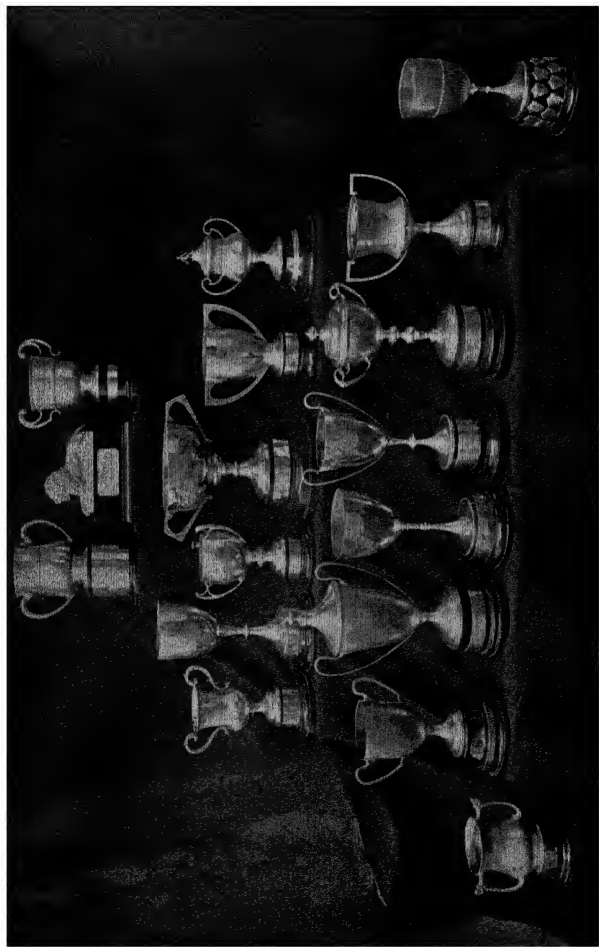
These rules and recommendations must be submitted for the sanction of the President who will have direct control over all matters relating to the club.

(d). All members will pay an entrance donation of Rs. 15 which is payable in instalments of Rs. 5 a year; and a monthly subscription of Rs. 3 while in residence. The accounts and cash will be kept in the College Treasury. The cashier will make disbursements on the order of the Officer-in-charge Civil Engineer Class.

(e). Any damage to furniture, the property of the College, will be assessed by the Personal Assistant to the Principal when the President with the Principal's approval will direct that the amount be recovered from the student.

76. Indian Overseer Class students will make their own arrangements for messing.

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**A Group of all the Silver Challenge Cups and Lion Trophy, 1929.**



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YEARLY LISTS OF STUDENTS WHO HAVE PASSED OUT OF THE COLLEGE FROM 1925 INCLUSIVE. (FOR LISTS DATING BACK TO 1910 INCLUSIVE SEE CALENDAR FOR 1928, FOR LISTS TO 1890 SEE CALENDAR FOR 1925, FOR LISTS TO 1875 SEE CALENDAR FOR 1922), AND FOR LISTS TO 1848 SEE CALENDAR FOR 1910.

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## 1925.

No.	Name.	Ranks and Corps, and where educated.	Marks gained.	Per cent.	Remarks.
CIVIL ENGINEER CLASS, 3RD YEAR. (Full Marks 7820).					
1	Ghananand Pande, B.Sc.	Muir Central College, Allahabad.	6307	81	Higher Certificate as Assistant Engineer. Council of India Prize of Rs. 1,000 for General Proficiency. Thomason Prize of Rs. 250 for best Indian student obtaining Higher Certificate. Cautley Memorial Gold Medal for Mathematics. Silver Medal for Descriptive Engineering, Electrical Engineering and Physics, and Mechanical Engineering, Sir Harcourt Butler's Cup for study and Athletics combined.
2	Ram Krishna Das Jain.	Agra College. Agra.	5990	77	Higher Certificate as Assistant Engineer. Rai Bahadur Kanhya Lal Gold Medal for best Indian Student who does not obtain Thomason Prize Silver Medal for Surveying.
3	Kamta Prasad Mush- ran.	Government High School, Allahabad.	5918	76	Higher Certificate as Assistant Engineer. Silver Medal for Drawing.
4	Baij Nath Khattri, B.Sc.	Central Hindu College, Benares.	5914	76	Higher Certificate as Assistant Engineer.
5	Abdul Sattar Faruqui,	Canning College. Lucknow	5838	75	Higher Certificate as Assistant Engineer. Thomason Memorial Gold Medal for best Engineering Design.
6	Niranjan Prasad Goyal.	Muir Central College, Allahabad.	5758	74	Higher Certificate as Assistant Engineer. Calcott Reilly Memorial Gold Medal for Applied Mechanics. Silver Medal for Laboratory Practice. Sushila and J. Mittra Memorial Silver Medal for Chemistry.
7	Ajit Singh Malhotra,	Mohindra College. Patiala	5708	73	Higher Certificate as Assistant Engineer.
8	Mahbub Ilahi Charagh,	Govt. College, Lahore, ...	5675	73	Ditto.

1925.

No.	Names.	Rank and Corps, and where educated.	Marks gained.	Per cent.	Remarks.
9	Gurbachan Singh ...	Govt. College, Lahore ...	5618	72	Higher Certificate as Assistant Engineer.
10	Des Raj Mehta, B.A.	D. A.-V. College, Lahore	5611	72	Ditto.
11	Prayag Narain, B.Sc.	Govt. High School, Bulandshahr.	5519	71	Ditto.
12	Bishan Swarup Mathur, B.Sc.	Govt. High School, Aligarh.	5367	6	Ditto.
13	Kanti Chandra Sinha	Muir Central College, Allahabad.	5339	68	Ditto.
14	Hari Lal Sally, B.A. ...	D. A.-V. College, Lahore	5189	66	Ditto.
15	Panna Lal Malhotra...	Govt. College Lahore ...	5147	66	Ordinary Certificate as Assistant Engineer.
16	Anant Ram Talwar, B.A.	D. A.-V College, Lahore	5139	66	Ditto.
17	Sohan Lal Najar, B.A.	St. Stephen's Mission College, Delhi.	5014	64	Ditto.
18	Hans Raj Gupta ...	Govt. College, Lahore ...	4981	64	Ditto.
19	Lal Chand Kapoor .	Govt. College, Lahore ...	4808	61	Ditto.
20	Jagat Narain Mehra, B.A.	Govt. High School, Bareilly.	4700	60	Ditto.
21	Madhab Singh Bisht	St. Joseph's College, Naini Tal.	4682	60	Ditto.
22	Clifton Lionel Vincent Francis.	St. Joseph's College, Naini Tal.	4654	59	Ditto.
23	Lakshman Swarup ...	C. M. High School, Meerut.	4636	59	Ditto.
24	Arjan Dev Khanna, B.A.	Govt. College, Lahore ...	4509	58	Ditto.
25	Bhagwan Dass ...	Dayal Singh College, Lahore.	4359	56	Ditto.
26	James Victor Stuart Edwards.	St. George's College, Mussoorie.	4330	55	Ditto.

1925.

No.	Names.	Rank and Corps, and where educated.	Marks gained.	Per cent.	Remarks.
<b>OVERSEER CLASS, SECOND YEAR.</b> (Full Marks, 7000).					
1	Gaindan Lal Mital ...	J. A. S. High School, Khurja.	5526	79	Higher Certificate as Overseer. Silver Medal and Rs 100 for General Merit. Rai Bahadur Kanhya Lal Silver Medal for best Indian Student. Silver Medal for Drawing. Durga Das Dutt Silver Medal for best Indian Student obtaining Higher Certificate.
2	Jai Narain (Jodhpur State)	Jaswant College, Jodhpur	5523	79	Higher Certificate as Overseer. Silver Medal for Descriptive Engineering. Rai Bahadur Kanhya Lal Silver Medal for 2nd Indian Student. Sullivan Memorial Medal for Mechanics. Silver Medal for Workshops.
3	Jitu Mal Garg ...	Govt. High School, Muzaffarnagar.	5469	78	Higher Certificate as Overseer. Silver Medal for Elementary Mathematics.
4	Nand Lal ...	High School, Payal ...	5446	78	Higher Certificate as Overseer. Silver Medal for Surveying.
5	Om Prakash ...	D. N. High School, Meerut.	5383	77	Higher Certificate as Overseer. Fairley Memorial Silver Medal for Applied Mechanics. Keay Memorial Silver Medal and Rs 18 for Estimating. Silver Medal for Accounts.
6	Munshi Lal Sangal ...	D. N. High School, Meerut.	5175	74	Higher Certificate as Overseer. Silver Medal for Photo. and Ferrotpe.
7	Jai Prakash ...	D. A.-V. High School, Multan.	5153	74	Higher Certificate as Overseer.
8	Kailash Chandra Mital	Govt. High School, Muzaffarnagar.	5099	73	Ditto.
9	Teja Singh Grewal ...	S. B. B. S. K. High School, Lahore.	4976	71	Ordinary Certificate as Overseer.
10	Bhagwat Prasad Vaishya.	Meerut College, Meerut	4973	71	Higher Certificate as Overseer.
11	Dal Chand ...	Govt. High School, Bijnor	4969	71	Ditto.
12	Ram Sarup ...	Meerut College, Meerut	4955	71	Ditto.

1925.

No.	Names.	Rank and Corps, and where educated.	Marks gained.	per cent.	Remarks.
18	Vishweshwar Dayal Mital.	A. V. High School, Sikandarabad.	4943	71	Higher Certificate as Overseer.
14	Mahabir Prasad Jaini	Govt. High School, Muzaffarnagar ...	4837	69	Ditto.
15	Vachas Pati ...	Ditto, ditto ...	4771	68	Ditto.
16	Har Narain Panday, (Jodhpur State).	Jaswant College, Jodhpur ...	4765	68	Ditto.
17	Raghunath Prasad Gupta.	A. V. High School, Sikandarabad ...	4750	68	Ditto.
18	Babu Ram Rajvanshi	Govt. High School, Meerut ...	4741	68	Ditto.
19	Gyan Chand Bajal	Meerut College, Meerut ...	4719	67	Ditto.
20	Janardan Das Mithal	Govt. High School, Meerut ...	4589	66	Ditto.
21	Ram Krishna	Govt. C. O. High School, Roorkee ...	4549	65	Ditto.
22	Jai Singh	Ditto, ditto ...	4521	65	Ditto.
23	Chandrika Prasad Mathur.	Govt. High School, Bulandshahr ...	4511	64	Ditto.
24	Jado Ram ...	Govt. High School, Muzaffarnagar ...	4511	64	Ditto.
25	Braj Nath ...	Govt. High School, Bijnor ...	4479	64	Ordinary Certificate as Overseer.
26	Kesho Ram ...	D. N. High School, Meerut ...	4438	63	Higher Certificate as Overseer.
27	Jagmohan Lal ...	Govt. C. O. High School, Roorkee ...	4432	63	Ordinary Certificate as Overseer.
28	Basdeo Sahai Sharma	St. John's High School, Agra ...	4307	62	Higher Certificate as Overseer.
29	Banwari Lal Singhal	J. A. S. High School, Khurja ...	4335	61	Ordinary Certificate as Overseer.
30	Mitra Sain Gupta	D. N. High School, Meerut ...	4163	59	Ditto.
31	Bishwambher Dayal Gupta.	A. V. High School, Sikandarabad ...	4162	59	Ditto.
32	Ram Chandra Seth	Govt. High School, Amroha ...	4157	59	Ditto.
33	Har Prasad Gupta	J. P. A. S. High School, Khurja ...	4140	59	Ditto.
34	Shiv Charan Das Agarwal.	Govt. High School, Bulandshahr ...	4123	59	Ditto.
35	Om Prakash Goyal	Govt. C. O. High School, Roorkee ...	3982	57	Ditto.
36	Sita Ram ...	Radhaswami Educational Institute, Agra.	3966	57	Ditto.
37	Puran Mal Mital	D. J. High School, Baraut ...	3954	56	Ditto.
38	Ajit Prasad Jain	D. N. High School, Meerut ...	3937	56	Ditto.
39	Joti Prasad Mital	D. J. High School, Baraut ...	3919	56	Ditto.
40	Munshi Lal Jain	Private ...	378	54	Ditto.
41	Jagnandan Dayal Goel	Govt. C. O. High School, Roorkee ...	3718	53	Ditto.

No.	Names.	Remarks.
DRAFTSMAN CLASS, 3RD YEAR.		
1	Samuel Chhidda ...	Certificate as Draftsman. Prize for General Merit.
2	Ayub Ali Khan ...	Certificate as Draftsman
3	Jagdish Pershad ...	Ditto.
4	Rashid-ul-Haq ...	Ditto.
5	Shiam Bihari Lal ...	{ Certificates awarded in October 1926.
6	Raghubir Singh ...	

## 1926.

No.	Names	Rank and Corps, and where educated.	Marks gained.	Per cent.	Remarks.
<b>CIVIL ENGINEER CLASS, 3RD YEAR.</b> (Full Marks <b>7820</b> ).					
1	Sardari Lal Kumar ...	Govt College, Lahore	5947	76	Higher certificate as Assistant Engineer. Council of India Prize of Rs. 1,000 for General Proficiency. Thomason Prize of Rs. 250 for best Indian student obtaining Higher Certificate. Cautley Memorial Gold Medal for Mathematics. Silver Medal or Descriptive Engineering and Surveying. General MacLagan's prize of books for Electrical Engineering and Physics. Silver Medal for Photo. and Ferrottype.
2	Lakshman Prasad Bhargava, B.Sc.	Govt. High School, Bulandshahr.	5862	75	Higher certificate as Assistant Engineer. Rai Bahadur Kanhya Lal Gold Medal for best Indian student who does not obtain Thomason prize. Thomason Memorial Gold Medal for best Engineering Design. Calcott-Reilly Memorial Gold Medal for Applied Mechanics. Sushila and J. Mitra Memorial Silver Medal for best Indian student who obtains highest marks in Chemistry.
3	Mohan Lal Batra, B.A.	Govt. College, Lahore ...	5809	74	Higher certificate as Assistant Engineer.
4	Ajit Singh Kalha ...	La Martinière College, Lucknow.	5728	73	Higher certificate as Assistant Engineer. Silver Medals for Mechanical Engineering and Laboratory Practice.
5	S. Mufid Hasan, B.Sc.	Govt. High School Fyzabad.	5703	73	Higher certificate as Assistant Engineer.
6	Niranjan Das Gulhati	Govt. College, Lahore	5537	71	
7	Nar Singh Das Kapur	Govt. High School, Lyallpur.	5352	68	
8	Cecil Arthur Browne	St. Joseph's College, Naini Tal.	5309	68	Higher certificate as Assistant Engineer. Silver Medal for Drawing. Sir Harcourt Butler's Cup for Study and Athletics Combined.

1926.

No.	Names.	Rank and Corps, and where educated.	Marks gained.	Per cent.	Remarks.
9	Zahid Hasan Khan ...	Muslim University, Ali-garh.	5291	68	Higher certificate as Assistant Engineer.
10	Rup Chand Sood ...	Govt. College, Lahore ...	5287	68	
11	Mohammed Zubair, B.A.	Govt. College, Lahore ...	5209	67	
12	Amar Nath Malhotra	Govt. College, Lahore ...	5176	66	
13	Diwan Chand Sharma	D. A.-V. College, Lahore	5140	66	
14	Dwarka Prasad Nayar	Govt. College, Ludhiana	5136	66	
15	Vidya Prakash Sethi, B.A.	Govt. College, Lahore ...	5092	65	
16	Madan Mohan Lal, B.A.	Govt. College, Lahore	5083	65	
17	Krishna Murari Agrawal, B.Sc.	Canning College, Lucknow.	5012	64	
18	Gopal Kishore Agrawal.	Canning College, Lucknow.	4987	64	
19	Amar Nath Chuni ...	Govt. College, Lahore ...	4956	63	
20	Khushi Ram Sharma	Govt. College, Lahore ...	4922	63	
21	Bir Sain Talwani	Forman Christian College, Lahore.	4891	63	Ordinary certificate as Assistant Engineer.
22	Vidya Ratna Goawara	S. D. High School, Lahore.	4734	61	
23	Ajit Prasad Bagehi, B.Sc.	St. John's College, Agra	4690	60	
24	Dev Raj Bhambri ...	Govt. College, Lahore ...	4672	60	
25	Snrya Jung Thapa (Nepal State).		4607	59	
26	William Frederic Charles Martin.	St. Joseph's College, Naini Tal.	4589	59	
27	Jyotsna Kumar Roy ...	Canning College, Lucknow.	4490	58	
28	Ram Chand Kinra ...	D. A.-V. College, Lahore	4471	57	
29	Bhawan Singh Bisht	St. George's College, Mussoorie.	4419	57	
30	Nageshwari Sahai Bisaria.	Agra College, Agra ...	4153	53	

1926.

No.	Names.	Rank and Corps, and where educated.	Marks gained.	per cent.	Remarks.
OVERSEER CLASS. SECOND YEAR					
(Full Marks 7000).					
1	Dharam Raj Bhrad-waj.	Govt. High School, Sitapur.	5141	73	Higher certificate as Overseer. Silver Medal and Rs. 100 for General Merit. Rai Bahadur Kanhya Lal's Silver Medal for best Indian student. Durga Das Dutt Silver Medal for best Indian student obtaining Higher certificate.
2	Kalyan Bux Mathur.	Govt. High School, Ajmer	5140	73	Higher certificate as Overseer. Fairley Memorial Silver Medal for Applied Mechanics. Silver Medal for Descriptive Engineering. Rai Bahadur Kanhya Lal's Silver Medal for 2nd Indian student Sullivan Memorial Silver Medal for Mechanics. Keay Memorial Silver Medal and Rs. 18 for Estimating. Silver Medal for Accounts.
3	Sewa Ram,	Govt. High School, Muzaffarnagar.	5079	73	Higher certificate as Overseer. Silver Medal for Elementary Mathematics.
4	Murari Lal.	N. R. E. C. Intermediate College, Khurja.	5025	72	Higher certificate as Overseer.
5	Jamuna Prasad Govila.	M. A. O. College, Aligarh.	4948	71	Higher certificate as Overseer. Silver Medals for Surveying and Drawing.
6	Satyavrat Sharma.	St. John's College, Agra	4761	68	Higher certificate as Overseer.
7	Shiv Charan Das Gupta.	N. R. E. C. Intermediate College, Khurja.	4755	68	Higher certificate as Overseer. Silver Medal for Workshops.
8	Mangat Singh Giri.	Govt. High School, Muzaffarnagar.	4750	68	Higher certificate as Overseer.
9	Jiwa Shankar Saxena	Govt. Intermediate College, Fyzabad.	4694	67	Ditto.
10	Niranjan Singh.	Govt. High School, Amballa City.	4681	67	Higher certificate as Overseer. Silver Medal for Photo. and Ferrottype.
11	Chhajju Mal.	Govt. High School, Meerut.	4655	67	Higher certificate as Overseer.



1926.

No.	Names	Bank and Corps, and where educated.	Marks gained.	Per cent.	Remarks.
12	Bharat Narain Agarwal.	Govt. High School, Bareilly.	4617	66	Higher certificate as Overseer.
13	Chhotey Lal.	D. N. H. School, Meerut	4597	66	Ditto.
14	Madho Ram Vaish.	Govt. C. O. High School, Roorkee.	4591	66	Ditto.
15	Bimal Prasad Jain.	C. M. High School, Meerut.	4676	65	Ditto.
16	Chiranji Lal.	Radha Swami Institute, Agra.	4566	65	Ditto.
17	Babu Lal Gupta	N. R. E. C. Intermediate College, Khurja.	4411	63	Ditto.
18	Budh Sen.	Do. do. ...	4392	63	Ditto.
19	Mohan Lal	Durbar High School, Jodhpur.	4340	62	Ditto.
20	Salig Ram.	Govt. Intermediate College, Allahabad.	4333	62	Ditto.
21	Amar Nath Shinghal.	Govt. High School, Muzaffarnagar.	4297	61	Ditto.
22	Paras Ram Agrawal.	Govt. C. O. High School, Roorkee.	4291	61	Ditto.
23	Joti Prasad.	Govt. High School, Muzaffarnagar.	4258	61	Ordinary certificate as Overseer.
24	Peare Lal Gupta.	Govt. High School, Aligarh.	4278	61	Higher certificate as Overseer.
25	Ugra Sen Sharma.	Govt. High School, Meerut.	4272	61	Ditto.
26	Kanwal Singh.	V. S. Jat High School, Kheragarhi.	4230	60	Ditto.
27	Bisheshwar Dayal Garg	Govt. High School, Muzaffarnagar.	4220	60	Ditto.
28	Srikrishna Bhatia.	A. V. High School, Sikandrabad.	4219	60	Ditto.
29	Brandaban.	Agra College, Agra.	4187	60	Ordinary certificate as Overseer
30	Kishori Lal Vaish	D. N. High School, Meerut.	4122	59	Ditto.
31	Rikkhab Das.	Govt. High School, Muzaffarnagar.	4058	58	Ditto.
32	Saiyid Manzoor Ali.	Govt. High School, Bulandshahr.	4034	58	Ditto.
33	Shiv Dayal Gupta.	Kayastha Pathshala High School, Aligarh.	4029	58	Ditto.
34	Shri Nivas Sharma.	Govt. High School, Muzaffarnagar.	3849	55	Ditto.
35	Chhotan Lal.	Govt. High School, Muzaffarnagar.	3726	53	Ditto.
36	Kanti Prasad Sharma.	D.N. High School, Meerut	3656	52	Ditto.
37	Madan Mohan Aran	D.N. High School, Meerut	3529	50	Ditto.

1926.

No.	Names.	Remarks.
DRAFTSMAN CLASS, THIRD YEAR.		
1	Md. Yasin Khan ...	Certificate as Draftsman. Prize for General Merit.
2	Samuel Egbert .	Certificate as Draftsman.
3	Anwar-ul-Haq ...	Ditto.
4	Jagat Pershad ...	Ditto.
5	Ugar Sain ...	Ditto.
6	Ganga Sahai ...	Ditto.

1927.

No.	Names.	Rank and Corps, and where educated.	Marks gained.	Per cent.	Remarks.
CIVIL ENGINEER CLASS, 3RD YEAR. (Full Marks 7820).					
1	Ghanshyam Narayan Dikshit, B.Sc.	University College, Allahabad.	6077	78	Higher Certificate as Assistant Engineer, Council of India Prize of Rs. 1,000 for General Proficiency. Thomason Prize of Rs. 250 for Best Indian student obtaining Higher Certificate. Cantley Memorial Gold Medal for Mathematics. Silver Medals for Descriptive Engineering, Surveying and Mechanical Engineering. General MacLagan's Prize of Books for Electrical Engineering and Physics Silver Medal for Laboratory Practice. Shushila and J. Mitra Memorial Silver Medal for best Indian student who obtains highest marks in Chemistry.
2	Karnail Singh	Khalsa College, Amritsar	5742	73	Higher Certificate as Assistant Engineer. Rai Bahadur Kanhya Lal Gold Medal for best Indian Student who does not obtain Thomason Prize. Sir Harcourt Butler's Cup for Study and Athletics combined.
3	Moti Lal Aggarwal	Govt. College, Lahore	5662	72	Higher Certificate as Assistant Engineer.
4	Amolak Ram Khanna, B.A.	Govt. College, Lahore	5611	72	Higher Certificate as Assistant Engineer. Calcott Reilly Memorial Gold Medal for Applied Mechanics.
5	Daulat Ram Jain	Agra College	5444	70	Higher Certificate as Assistant Engineer, Thomason Memorial Gold Medal for best Engineering design. Silver Medal for Drawing.
6	Indra Jit Rai Tandan,	Mohinda College, Patiala	5257	67	Higher Certificate as Assistant Engineer.
7	Rup Lal Varma	F. C. College, Lahore	5211	67	
8	Manohar Lal Sood, B.A.	Govt. College, Lahore	5077	65	
9	Hari Krishen Nivas	Govt. College, Lahore	5076	65	
					Ordinary Certificate as Assistant Engineer.

1927.

No.	Names.	Rank and Corps, and where educated.	Marks gained.	Per cent.	Remarks.
10	Dwarka Nath Khurana	Govt. College, Lahore	5058	65	} Ordinary Certificate as Assistant Engineer
11	Ishwara Nand Bahl ...	Govt. College, Lahore	4936	63	
12	Ujagar Lal Chaturvedi.	St. John's School, Agra	4927	63	
13	Sita Ram Mehra ..	Govt. College, Lahore	4925	63	
14	Jagdish Prasad ...	Hindu University, Benares	4904	63	
15	Sri Ram Wasudev, B.A.	G. H. School, Dharamshala	4904	63	
16	Devi Chandra Khanna	Govt. College, Lahore	4860	62	
17	Vidya Prakash ...	Govt. College, Lahore	4825	62	
18	Kirpa Narain, B.A. ...	St. Stephen's College, Delhi	4806	61	
19	Barkat Ram Lamba	D.A.V. College, Lahore	4794	61	
20	Baboo Singh Jootla ...	Sain Das A.S. High School, Jullundur.	4735	61	} Ordinary Certificate as Assistant Engineer. Silver Medal for Photo. and Ferrottype.
21	Beli Ram Malhotra, B.Sc.	V. B. High School, Dera Ismail Khan.	4687	60	
22	Richard Frederick Thomas Farrant.	St. George's College, Mussoorie.	4288	55	
23	Bisheshar Dayal Goyal	University College of Science, Allahabad.	4144	53	
24	Gokal Chand ...	Govt. College, Lahore	4138	53	
25	Aishwarya Chandra Agrawal.	Agra College, Agra	4106	53	
26	Girdhari Lal Kumar...	Govt. College, Lahore	4087	52	

1927.

No.	Names.	Rank and Corps, and where educated.	Marks gained.	Per cent.	Remarks.
OVERSEER CLASS SECOND YEAR.					
(Full Marks, 4900.)					
1	Kailash Chandra Mital	Muslim University Inter College, Aligarh.	3477	71	Higher Certificate as Overseer Silver Medal and Rs. 100 for General Merit. Rai Bahadur Kanhya Lal Silver Medal for best Indian student who stands first. Silver Medal for Drawing and Ferrottype. Durga Das Dutt Silver Medal for Best Indian student obtaining Higher Certificate.
2	Jambu Prasad	Govt. High School, Saharanpur.	3436	70	Higher Certificate as Overseer. Rai Bahadur Kanhya Lal Silver Medal for Best Indian student who stands second in class.
3	Parmatma Swarup	Church Mission High School, Meerut.	3417	70	Higher Certificate as Overseer. Fairley Memorial Silver Medal for Applied Mechanics and Silver Medal for accounts.
4	Shiam Sundar Lal Bhatnagar.	Govt. High School, Saharanpur.	3401	69	Higher Certificate as Overseer. Keay Memorial Silver Medal and Rs. 18 for Estimating.
5	Maunn Lal Mital	Govt. High School, Muzaffarnagar.	3361	69	Higher Certificate as Overseer. Silver Medal for Elementary Mathematics. Sullivan Memorial Silver Medal for Mechanics.
6	Kanwal Singh	N. R. E. C. Inter. College, Khurja	3358	69	Higher Certificate as Overseer. Silver Medal for Workshops.
7	Babu Ram	A. V. High School, Sikandarabad.	3307	67	Higher Certificate as Overseer. Silver Medal for Surveying.
8	Hazari Lal	Divisional College, Meerut	3254	66	Higher Certificate as Overseer. Silver Medal for Descriptive Engineering.
9	Har Charan Das	N. R. E. C. Inter. College, Khurja.	3187	65	Higher Certificate as Overseer.
10	Babu Ram Sharma	Govt. High School, Muzaffarnagar.	3141	64	Ordinary Certificate as Overseer.
11	Mulk Raj Bahadur	N. R. E. C. Inter. College, Khurja.	3121	64	Higher Certificate as Overseer.
12	Kanwal Nain Singh	K. E. M. Jat High School, Lakhaoti.	3121	64	
13	Babu Ram Gupta	Govt. High School, Muzaffarnagar.	3096	63	
14	Puran Mal Gupta	Govt. High School, Muzaffarnagar.	3092	63	Ordinary Certificate as Overseer.
15	Joti Prasad Jain	Church Mission High School, Meerut.	3045	62	

## 1927.

No.	Names.	Rank and Corps, and where educated.	Marks gained.	Per cent.	Remarks.
16	Ram Sewak Misra ...	Govt. Inter. College, Alahabad.	2959	60	} Ordinary Certificate as Overseer.
17	Phul Chand ..	N. R. E. C. Inter. College, Khurja.	2929	60	
18	Prayag Das ..	D. N. High School, Meerut	2917	60	
19	Ram Prasad Rastogi	Govt. Inter. College, Moradabad.	2878	59	
20	Ratan Lal Jain	N. R. E. C. Inter. College, Khurja.	2856	58	
21	Shiv Saran Maheswari	D. A. V. High School, Muzaffarnagar.	2834	58	
22	Rikhab Das ...	Govt. High School, Muzaffarnagar.	2817	57	
23	Tilak Ram ...	Govt. High School, Muzaffarnagar.	2795	57	
24	Suraj Prakash Hajeley	Victoria College, Lashkar	2788	57	
25	Bhagwat Dayal Sharma	Govt. High School, Meerut	2785	57	
26	Uttam Rai Gupta ...	Govt. High School, Badaun	2782	57	
27	Ram Swarup Nohawar	E. I. R. A. V. High School, Tundla.	2779	57	
28	Ram Sarup ..	Govt. High School, Muzaffarnagar.	2743	56	
29	Janeshwar Prasad ...	C. M. High School, Meerut	2736	56	
30	Madan Mohan Lal Bhatnagar.	Radha Swami Inter. College, Agra.	2702	55	
31	Jado Ram ...	Govt. Inter. College, Alahabad.	2654	54	
32	Peeru Mal Sharma ...	Govt. High School, Muzaffarnagar.	2633	54	
33	Sewa Ram ...	D. A. V. High School, Muzaffarnagar.	2621	53	
34	Muhammad Wali Ullah Khan.	Govt. High School, Meerut	2619	53	
35	Bhola Nath ...	N. R. E. C. Inter. College, Khurja.	2613	53	
36	Bhag Mal ...	Jat Vedic High School, Baraut.	2550	52	
37	Anand Sarup (Tehri State).	Govt. C. O. High School, Roorkee.	2530	52	
38	Tara Chand ...	Cantt. A. V. High School, Meerut.	2454	50	
39	Dipa Chand Gupta ...	N. R. E. C. Inter. College, Khurja.	2450	50	

1927.

No.	Names.	Remarks.
<b>DRAFTSMAN CLASS, THIRD YEAR.</b>		
1	Ladli Kishore Agnihotri ...	Certificate as Draftsman. Prize for General Merit.
2	S. M. Hanif ...	Certificate as Draftsman. Prize for General Merit.
3	Babu Lal ...	Certificate as Draftsman.
4	Monzoor Hussain ...	Ditto.
5	Daya Ram ...	Ditto.
6	Parmeshwari Das Goyal ...	Ditto.
7	Murtaza Hussain ...	Ditto.
8	Mangal Sen Goyal ...	Ditto.
9	Mushfiq Hussain ...	Ditto.
10	Munshi Lal Sharma ...	Ditto.
11	Abdul Awal ...	Ditto.
12	Khurshaid Ali ...	Certificate as Simple Draftsman.
13	Abrar Hussain ...	Certificate as Tracer.

1928.

No.	Names.	Rank and Corps, and where educated.	Marks gained.	Per cent.	Remarks.
CIVIL ENGINEER CLASS, 3RD YEAR.					
(Full Marks 7862).					
1	Yadava Mohan.	... Divisional College, Meerut,	6076	77	Higher Certificate as Assistant Engineer, Council of India Prize of Rs. 1,000 for General Proficiency. Cautley Memorial Gold Medal for Mathematics. Calcott Reilly Memorial Gold Medal for Applied Mechanics. Silver Medals for Descriptive Engineering and Surveying. General MacLagan's Prize of Books for Electrical Engineering and Physics. Silver Medals for Laboratory Practice and Mechanical Engineering. Sir Harcourt Butler Cup for Study and Athletics combined.
2	Ram Lal Khanna, B.A.,	Govt. College, Lahore,	5689	72	Higher Certificate as Assistant Engineer. Thomason Prize of Rs. 250 for the most Distinguished Student who obtains the Higher Certificate, but does not gain the Council of India Prize.
3	Chuni Lal Handa,	... Govt. College, Lahore,	5643	72	Higher Certificate as Assistant Engineer Bai Bahadur Kanhya Lal Gold Medal for best Indian Student who does not obtain the Thomason Prize. Silver Medal for Photo. and Ferrottype.
4	Harnandan Prasad Sinha.	Lucknow University, Lucknow.	5628	72	Higher Certificate as Assistant Engineer.
5	Azid Bakhsh,	... Govt. College, Lahore,	5548	71	
6	Jainti Prasad Jain,	... Divisional College, Meerut,	5544	71	
7	Hari Chand Kalra,	... Govt. College, Lahore,	5476	70	



1928.

No.	Names.	Rank and Corps, and where educated.	Marks gained.	Per cent.	Remarks.
8	Shiv Nath, B.Sc., ...	Forman Christian College, Lahore.	5434	69	Higher Certificate as Assistant Engineer Thomason Memorial Gold Medal for best Engineering Designs. Sushila and J. Mittra Memorial Silver Medal for best Indian Student who obtains Highest marks in Chemistry.
9	Raghubir Saran Jain,	Divisional College, Meerut,	5342	68	Higher Certificate as Assistant Engineer.
10	Bikram Jit, ...	Govt. College, Lahore, ...	5282	67	
11	Qurban Singh, ...	Khalsa College, Amritsar,	5171	66	
12	Regina d'wray Wilson,	St. George's College, Mussoorie.	5121	65	
13	Surendra Nath Tripathi	Canning College, Lucknow,	5093	65	Ordinary Certificate as Assistant Engineer.
14	Daya Ram Yadava, B.Sc.	Agra College, Agra. ...	5086	65	
15	Krishan Lal Bansal, ...	Govt. High School, Gurdaspur.	4988	63	
16	Krishna Nand Dua, ...	Canning College, Lucknow,	4838	62	
17	Shiam Sundar Lal, ...	University School of Science Allahabad.	4788	61	
18	Mohammad Naiman Ansari.	Muslim University, Aligarh,	4744	60	
19	Shiva Shanker Sharma,	Canning College, Lucknow,	4678	60	
20	Wilfred Ronald Fleury,	St. Joseph's College, Naini Tal.	4656	59	
21	Percy Harold McLean,	St. Joseph's College, Naini Tal.	4565	58	Ordinary Certificate as Assistant Engineer. Silver Medal for Drawing.
22	Dharm Pal Sondhi, ...	S. P. College. (Srinagar) Kashmir.	4539	58	
23	Izhar Ali Abbasi, ...	Muslim University, Aligarh,	4515	57	
24	Diwan Chand Bahl, ...	D. A. V. College, Lahore, ...	4493	57	
25	Charanjit Lal Malhotra	Forman Christian College, Lahore.	4359	55	Ordinary Certificate as Assistant Engineer.
26	Mir Abdur Rahim, ...	Govt. College, Lahore, ...	4087	52	

1928.

No.	Names.	Rank and Corps, and where educated.	Marks gained.	per cent.	Remarks.
OVERSEER CLASS, SECOND YEAR.					
(Full Marks 4700).					
1	Budhi Parsad Jain.	Meerut College, Meerut.	3260	69	Higher certificate as Overseer. Silver Medal and Rs. 100 for General Merit. Rai Bahadur Kanhya Lal Silver Medal for best Indian student who stands first. Silver Medal for Elementary Mathematics and Estimating. Durga Dass Dutt Silver Medal for best Indian student obtaining Higher certificate.
2	Ram Prasad Jhaldyal.	Mesmore High School, Pauri Garhwal.	3210	68	Higher certificate as Overseer Fairley Memorial Silver Medal for Applied Mechanics. Silver Medal for Descriptive Engineering. Rai Bahadur Kanhya Lal Silver Medal for Indian student who stands 2nd in the class.
3	Chatar Singh.	Meerut College, Meerut.	3186	68	Higher certificate as Overseer. Silver Medal for Workshops.
4	Suraj Mal Gupta.	Government High School, Muzaffarnagar.	3178	68	} Higher certificate as Overseer.
5	Shiv-Nath Sharma.	Government High School, Saharanpore.	3168	67	
6	Babu Ram.	Government High School, Meerut.	3075	65	Ordinary certificate as Overseer.
7	Brij Nandan Bhargava.	D. A. V. High School, Muzaffarnagar.	3042	65	} Higher certificate as Overseer.
8	Amba Sahai.	Government High School, Mainpuri.	3015	64	
9	Surendra Prasada Garga.	Deva Nagri High School, Meerut.	3006	64	
10	Krishna Lal	N. A. S. High School, Meerut.	2990	64	Higher certificate as Overseer. Silver Medal for Surveying.
11	Salek Chand.	N. A. S. High School, Meerut.	2973	63	} Higher certificate as Overseer.
12	Gokula Nand Kimochi	King George's Govt. High School, Lansdowne	2951	63	

1928.

No.	Names.	Rank and Corps, and where educated.	Marks gained.	per cent.	Remarks.
13	Shanker Lal Mital	N. R. E. C. Inter College, Khurja.	2950	63	Higher certificate as Overseer.
14	Jagdish Prasad Pradhan.	Meerut College, Meerut.	2891	62	Higher certificate as Overseer. Sullivan Memorial Silver Medal for Mechanics.
15	Sohan Lal Garga.	J. A. High School, Khurja	2883	61	} Ordinary Certificate as Overseer.
16	Lakshmi Narain.	Government High School, Muzaffarnagar.	2813	60	
17	ManSumrat Das Jain.	Meerut College, Meerut.	2810	60	
18	Balbir Singh.	D. S. M. High School, Kanth (Moradabad).	2788	59	
19	Ram Prasad Bhargava	N. R. E. C. Inter College, Khurja.	2754	59	} Ordinary certificate as Overseer. Silver Medal for Drawing.
20	Jawahar Singh.	Radhaswami Educational Inst. Dayal Bagh, Agra.	2751	59	
21	Hari Singh.	Government High School, Saharanpur.	2749	58	
22	Ajudhia Prasad.	N. A. S. High School, Meerut.	2720	58	
23	Munshi Lal Mital.	Government High School, Aligarh.	2705	58	} Ordinary Certificate as Overseer.
24	Om Prakash Gupta.	Government High School, Saharanpur.	2700	57	
25	Jai Prakash Vaish.	Government C. O. High School, Roorkee.	2687	57	
26	Asa Ram.	Government High School, Muzaffarnagar.	2668	57	
27	Har Prasad Sharma.	Meerut College, Meerut.	2647	56	} Ordinary certificate as Overseer. Silver Medal for Accounts.
28	Om Prakash Vaish.	Government High School, Muzaffarnagar.	2641	56	
29	Gulab Singh Sharma.	P. B. A. S. High School, Hathras.	2632	56	
30	Mirza Muhammad Tahir..	Shia Inter College, Lucknow.	2623	56	
31	Ganga Prasad.	N. R. E. C. Inter College, Khurja.	2620	56	

1923.

No.	Names.	Rank and Corps, and where educated.	Marks gained.	per cent.	Remarks.
32	Udai Singh.	J. A. S. High School, Khurja.	2569	55	} Ordinary certificate as Overseer.
33	Kailash Chandra.	N. R. E. C. Inter. College, Khurja.	2560	54	
34	Dwarka Nath.	N. A. S. High School, Meerut.	2533	54	
35	Shivcharan Lal Agarwal.	Government High School Haathras.	2508	53	
36	Gulab Rai.	Maharaja's Intermediate College, Jaipur.	2421	52	
37	Seva Ram.	D. A. V. High School, Muzaffarnagar.	2368	50	

1928.

No.	Names.	Remarks.
DRAFTSMAN CLASS, THIRD YEAR.		
1	Shanti Prakash Sandil. ...	Certificate as Draftsman. Silver Medal for General Merit, and 1st Prize of Rs. 30 as best Draftsman.
2	Gotum Pershad, ...	Certificate as Draftsman, and 2nd Prize of Rs. 20 as 2nd best Draftsman.
3	Ayub Khan, ..	Certificate as Draftsman.
4	Ikram Singh, ...	Ditto.
5	Ram Prasad, ...	Ditto.
6	Habib Ullah Khan, ...	Ditto.
7	Abdul Majid ...	Certificate as Simple Draftsman.
8	Abdul Sattar, ...	Certificate as Draftsman.
9	Krishna Deo Nayer, ...	Certificate as Simple Draftsman.
10	Shabbir Ahmed, ...	Ditto.
11	Banarsi Das, ...	Ditto.
12	Misri Singh, ...	Certificate as Draftsman, (granted in January 1929).

1929.

No.	Names.	Rank and Corps, and where educated.	Marks gained.	Per cent	Remarks.
CIVIL ENGINEER CLASS 3RD YEAR.					
(Full Marks 7890).					
1	Dharam Chand Baijal, B.Sc.	Meerut College, Meerut. ...	6081	77	Higher Certificate as Assistant Engineer. Council of India Prize of Rs. 1,000 for General Proficiency. Silver Medal for Descriptive Engineering and Surveying. Calcott Reilly Memorial Gold Medal for Applied Mechanics.
2	Mulk Raj Chopra, ...	Govt. College, Lahore, ...	5902	75	Higher Certificate as Assistant Engineer. Thomason Prize of Rs. 250 for the most distinguished student who obtains Higher Certificate, but does not gain Council of India Prize. Silver Medal for Mechanical Engineering. General MacLagan's prize of Books for Electrical Engineering and Physics.
3	Des Raj Khanna, ...	D. A. V. High School, Lahore.	5834	74	Higher Certificate as Assistant Engineer. Rai Bahadur Kanhya Lal Gold Medal for best Indian Student who does not obtain Thomason Prize.
4	Shanti Lal Sahgal, B.A.,	Govt. College, Lahore, ...	5761	73	Higher Certificate as Assistant Engineer. Silver Medal for Drawing and Laboratory Practice. Sushila & J. Mitra Memorial Silver Medal for best Indian Student who obtains highest marks in Chemistry.
5	Des Raj Kohli, B.A., ...	D. A. V. College, Lahore,	5657	72	Higher Certificate as Assistant Engineer.
6	Parmeshwar Swaroop Bhatnagar.	La Martinière College, Lucknow.	5643	72	
7	Ram Das.	Govt. High School, Jullundur City.	5564	71	Higher Certificate as Assistant Engineer. Cautley Memorial Gold Medal for Mathematics.
8	Balwant Singh Nag,	Khalsa College, Amritsar,	5547	70	Higher Certificate as Assistant Engineer. Silver Medal for Photo. and Ferrottype.

1929.

No.	Names.	Rank and Corps, and where educated.	Marks gained.	Per cent.	Remarks.
9	Atul Chandra Mukerji. B.Sc.	University College of Science, Allahabad.	55	97.70	Higher Certificate as Assistant Engineer.
10	Ripdaman Singh, ...	Khalsa College, Amritsar,	54	96.70	
11	Hari Das Awasthy, B.A.,	Govt. College, Lahore,	54	65.69	
12	Romesh Chandra Mehta.	Govt. College, Lahore, ...	53	97.68	
13	Ganpat Rai Chadha, B.A.	Govt. College, Lahore, .	53	53.68	
14	Robert Henry Goodman,	St Joseph's College, Naini Tal	52	74.67	Higher Certificate as Assistant Engineer. Thomason Memorial Gold Medal and Books for best Engineering Design.
15	Goverdhan Lall, B.A., ...	Govt. College, Lahore, ..	51	25.65	
16	Shiva Narain Wadhwa,	D. A. V. College, Lahore,	51	29.65	
17	Kundan Lall Bhatia, ...	Govt. College, Lahore, ...	50	54.64	
18	Shri Ram Agarwala, B.Sc.	Agra College, Agra,	49	44.63	
19	Brahma Swarup Mathur. B.Sc.	Allahabad University, Allahabad.	49	31.62	Ordinary Certificate as Assistant Engineer.
20	Birendra Gupta, ...	Govt. High School, Muzaffarnagar.	49	12.62	
21	Suraj Bhan Batra, B.A.,	Govt. College, Lahore, ...	48	88.62	
22	Satindra Kumar Mukerji, B.Sc.	The Nizam College, Hyderabad Deccan.	48	55.62	
23	Sobhag Rai Mehta, (Bahawalpur State).	S. F. College, Bahawalpur State.	47	31.60	
24	Raghubir Sahai Mathur,	Dharam Samaj High School, Aligarh.	45	42.58	
25	Radhey Shyam Gupta, ...	Agra College, Agra, ...	44	76.57	
26	Brij Mohan Johri, ..	Agra College, Agra, ...	44	04.56	
27	Rama Swarup Chaturvedi.	Govt. High School, Cawnpore.	43	89.56	
28	Shiva Dayal Sinha, ...	Meerut College, Meerut.	43	82.56	
29	Krishnanand, ..	K. P. University College, Allahabad.	41	52.53	
30	Gurdial Pershad, (Rampur State).	Govt. High School, Meerut,	41	9.52	
	Jwala Prashad Singh, ...	Khalsa College, Amritsar,	52	54.67	Higher Certificate as Assistant Engineer.
31	Kishori Lal,	Agra College, Agra, ..	38	09.48	Fails.

## 1929.

No.	Names.	Rank and Corps, and where educated.	Marks gained.	Per cent.	Remarks.
OVERSEER CLASS, SECOND YEAR. (Full Marks 4700).					
1	Shiva Sharana Swami.	Govt. High School, Bijnor.	3446	73	Higher certificate as Overseer. Silver Medal and Rs. 100 for General Merit. Rai Bahadur Kunhya Lal Silver Medal for Indian student who stands first in the Class. Silver Medal for Descriptive Engineering. Durga Dass Dutt Silver Medal for best Indian student obtaining Higher certificate.
2	Nathu Mal Jain.	Govt. High School, Cawnpore.	3370	72	Higher certificate as Overseer. Fairley Memorial Silver Medal for Applied Mechanics. Rai Bahadur Kanhya Lal Silver Medal for Indian student who stands 2nd in the class.
3	Jiwan Lal.	Govt. High School, Muzaffarnagar.	3344	71	Higher certificate as Overseer. Sullivan Memorial Silver Medal for Mechanics. Key Memorial Silver Medal and Rs. 18 for Estimating. Silver Medal for Workshop practice and Elementary Mathematics.
4	Sukhbir Singh.	Govt. High School, Muzaffarnagar.	3332	71	Higher certificate as Overseer.
5	Dund Bahadur.	Bareilly College, Bareilly.	3263	69	Higher certificate as Overseer. Silver Medal for Surveying and Drawing.
6	Raghuber Dat Pande.	Govt. High School, Nainital.	3089	66	Higher certificate as Overseer
7	Raja Ram.	Meerut College, Meerut.	3081	66	
8	Mohammad Rizwan Ghani.	Osmania College, Hyderabad, Deccan.	3073	65	
9	Narain Dat Pujari.	Govt. High School, Srinagar, Garhwal.	3042	65	Ordinary certificate as Overseer.
10	Trilok Chand Gupta.	Meerut College, Meerut.	3033	65	Higher certificate as Overseer.
11	Mathura Datt Joshi.	Govt. High School, Nainital.	2987	64	
12	Indra Prakash.	Govt. High School, Saharanpur.	2981	63	
13	Bhagwat Dayal.	A. V. High School, Meerut.	2941	63	
14	Jagdish Saran.	Meerut College, Meerut.	2938	63	



1929.

No.	Names.	Rank and Corps, and where educated.	Marks gained.	Per cent.	Remarks.
15	Dhara Singh.	Agra College, Agra.	2898	62	} Higher Certificate as Overseer.
16	Jwala Prasad Sinha.	Meerut College, Meerut.	2877	61	
17	Anand Prakash Gupta.	Kanya Kubja Inter. College, Lucknow.	2848	60	
18	Kunwar Bahadur.	Govt. High School, Muzaffarnagar.	2818	60	Ordinary certificate as Overseer.
19	Areh Das Jain.	B. D. High School, Ambala.	2782	59	} Ordinary certificate as Overseer. Silver Medal for Accounts.
20	Nathu Singh.	Govt. High School, Najibabad.	2776	59	
21	Virendra Vir Rastogi.	Divisional College, Meerut.	2763	59	} Ordinary certificate as Overseer.
22	Amrit Roop Rai.	Jaswant College, Jodhpur.	2759	59	
23	Ballabh Prasad.	A. P. Mission High School, Dehra Dun.	2724	58	
24	Roop Chandra Vaish.	Meerut College, Meerut.	2722	58	} Silver Medal for Photo. and Ferrottype.
25	Tara Chand.	Meerut College, Meerut.	2707	58	
26	Basant Lal.	W. I. M. High School, Bareilly.	2705	58	} Ordinary certificate as Overseer.
27	Mirza Hasan Ahmad Baig.	Muslim University, Aligarh.	2690	57	
28	Babu Ram.	Govt. High School, Muzaffarnagar.	2688	57	
29	Gokul Dev Thapliyal.	Private.	2675	57	} Ordinary certificate as Overseer.
30	Gopi Nath Bansal.	Meerut College, Meerut.	2596	55	
31	Ram Chandra Singhal.	N. R. E. C. College, Khurja.	2574	55	
32	Harcharan Lal Agrawal.	Bareilly College, Bareilly.	2515	54	

1929.

No.	Names of Students.	Remarks.
<b>DRAFTSMAN CLASS, THIRD YEAR.</b>		
1	Jai Nand Sharma. ...	Certificate as Draftsman, 1st class. 1st Prize of Rs. 30 as best Draftsman.
2	Mohammad Mustafa Zaidi, ...	Certificate as Draftsman, 1st class. 2nd Prize of Rs. 20 as 2nd best Draftsman.
3	Bashir Ahmad, ...	Certificate as Draftsman, 2nd class.



1929.

## PERCENTAGE OF MARKS OF STUDENTS.

The following table shows the percentages of marks gained by the various classes for the last ten years and the numbers that qualified :—

Year.	Civil Engineer Class.									Overseer Class.					
	3rd year.			2nd year.			1st year.			2nd year.			1st year.		
	Highest Marks.	No. Qualified.	Average Marks.	Highest Marks.	No. Qualified.	Average Marks.	Highest Marks.	No. Qualified.	Average Marks.	Highest Marks.	No. Qualified.	Average Marks.	Highest Marks.	No. Qualified.	Average Marks.
1925-26 ...	76	30	65	83	26	62	76	28	61	73	37	62	70	40	60
1926-27 ...	78	26	63	76	27	63	77	31	65	71	39	60	74	37	59
1927-28 ...	77	26	64	79	31	66	75	29	62	69	37	60	73	33	57
1928-29 .	77	31	65	77	28	63	79	32	62	73	32	62	76	35	60





THE START OF THE SACK RACE.



# ANNUAL REPORT, 1928-29.

FROM

P. P. PHILLIPS, Esq., Ph. D., F. I. C., I. E. S.,  
OFFG. PRINCIPAL, THOMASON COLLEGE, ROORKEE.

TO

THE DEPUTY SECRETARY TO GOVERNMENT,  
UNITED PROVINCES, EDUCATION DEPARTMENT.

*Dated Roorkee, the 16th July, 1929.*

SIR,

I have the honour to forward herewith the annual report of the Thomason Civil Engineering College for the session 1928-29. together with the usual statements of accounts for the financial year ending the 31st March, 1929.

## ADMINISTRATION.

The following official and non-official gentlemen served on the Thomason College Advisory Council during the year :—

Mr. Jwala Prasada, I.S.E., Chief Engineer and Secretary to Government, Irrigation Branch, Public Works Department, United Provinces,..... *President.*

Mr. P. H. Tillard, I.S.E., Chief Engineer, Buildings and Roads Branch, Public Works Department, United Provinces.

Mr. H. R. Harrop, M.A., M.L.C., Offg. Director of Public Instruction, United Provinces.

Representative of the Institution of Engineers (India), ..... *Vacant.*

Mr. S. P. Shah, I.C.S., Director of Industries, United Provinces.

The Divisional Superintendent, East Indian Railway, Lucknow.

Pandit Nanak Chand, M.A., LL.B., M.L.C., United Provinces Legislative Council.

Maulvi Zahuruddin, B.A., M.L.C., United Provinces Legislative Council.

Khan Bahadur A. H. Mirza, United Provinces Board of Industries.



Mr. I. D. Varshani, United Provinces Chamber of Commerce.

Mr. J. P. Srivastava, M.Sc., M.L.C., Upper India Chamber of Commerce.

Dr. Ganesh Prasad, M.A., D.Sc., University of Allahabad.

Mr. Raja Ram, B.Sc., A.M.I.C.E., Professor of Sanitary Engineering, Thomason College.

Dr. P. P. Phillips, PH. D., F.I.C., I.E.S., Offg. Principal, Thomason College, ..... *Secretary.*

The College Board of Studies met 5 times during the year, and discussed and settled a number of educational matters connected with internal work of the College.

#### CHANGES IN THE COLLEGE STAFF.

Lt.-Colonel E. W. C. Sandes, D.S.O., M.C., R.E., proceeded on leave out of India from the afternoon of the 9th May, 1929 combined with the College vacation from the 16th July, 1929 to 15th October, 1929 and Dr. P. P. Phillips, PH. D., F.I.C., I.E.S., Professor of Applied Science was appointed to officiate as Principal from the afternoon of the 9th May, 1929.

Mr. Salig Ram resigned charge of his duties as Professor of Civil Engineering, Thomason College, on the afternoon of the 12th October, 1928 and reverted to his substantive appointment as Executive Engineer, Public Works Department, Irrigation Branch, United Provinces, and Mr. Mohsin Ali joined as Professor of Civil Engineering on the forenoon of 23rd October, 1928, on transfer from the Irrigation Department, United Provinces.

Mr. R. A. Bradshaw-Smith resigned charge of his duties as Professor of Civil Engineering, Thomason College, on the forenoon of the 16th October, 1928 and reverted to his substantive appointment as Executive Engineer, Public Works Department, Irrigation Branch, United Provinces; and Mr. G. Lacey joined as Professor of Civil Engineering on the forenoon of 16th October, 1928 on transfer from the Irrigation Department, United Provinces.

Mr. Mohsin Ali proceeded on one month's leave on average pay from 7th January, 1929 to the forenoon of 6th February, 1929.

Lieut. J. S. Gurney, Lecturer in Civil Engineering was appointed Head Master and Instructor in Surveying, Overseer Class, with effect from the 16th October 1928.

Dr. P. P. Phillips PH. D., F.I.C., I.E.S., on return from leave, assumed charge of his duties as Professor of Applied Science from the 16th October, 1928.

Major A. M. McLean, M.C., on return from leave resumed charge of his duties as Assistant Professor of Mechanical and Electrical Engineering from the 16th October, 1928.

Mr. C. J. Veale on return from leave took over charge of his duties as Professor of Surveying and Drawing from the forenoon of 16th October, 1928.

Mr. F. J. Smith retired on superannuation pension from the 15th March, 1929; and Mr. H. T. Cumming, Lecturer in Survey took over charge as Lecturer in Drawing in addition to his own duties from the 15th March, 1929.

Mr. P. C. Sen Gupta, Lecturer in Mathematics was on leave on Medical certificate from the 1st April, 1929 to 30th June, 1929.

Mr. W. J. Psychers, Assistant Photo.-Mechanical Press proceeded on leave on Medical certificate for 8 months with effect from the 7th January, 1929 and B. Rang Behari Lal, Foreman, Litho. Printing Section, was appointed to officiate in the leave vacancy.

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## DEPARTMENT OF CIVIL ENGINEERING.

All three Professors were on duty throughout the Session. The Department, however, feels the loss of Mr. J. S. Gurney, the Lecturer in Civil Engineering who was appointed Head Master of the Overseer Class.

The usual number of preliminary designs were carried out by the students under the supervision of the Professors, and this year for the first time students of the third year were given a course of Lectures and demonstrations on the use of explosives in demolitions by Sergeant-Major Boxall. R. E., by arrangement with the Commandant, K.G.O. 1st Bengal Sappers and Miners, Roorkee.

Two minor projects in buildings and sanitation were carried out by the 3rd year students with the assistance of Professors as a preliminary

to the undertaking of the major project in which they work entirely unaided.

The minor projects were on the whole very well executed. They included (i) a hospital for infectious diseases, Roorkee, (ii) a drainage and sewage disposal scheme for the Civil Lines Area, Roorkee.

The major project, dealt with the construction of a single line of railway designated the Roorkee-Hardwar Chord, and was set by Mr. J. D. Michæl, I.S.E., Assistant Executive Engineer, East Indian Railway. It served a dual purpose since it not only tested the professional knowledge of the students in a very practical manner, but also elucidated some information ultimately to be of use to the Railway Department. In his report on the project, the examiner remarks as follows :—

“The work submitted was of a high average standard particularly Surveying and Drawing.”

“Reconnaissance Survey is the Survey of an area not of a line.” The Reconnaissance reports were in most cases merely detailed location reports instead of giving a general description of the area and the reasons why the alignment selected would best pay for this investigation. Very few students noted that the gradient at the junction with the Dehra Dun branch was 1 in 200 which would presumably have to be reggraded from the Canal bridge resulting in a higher Formation Level at the junction.”

“Many students saved money by lowering the Formation Level between the Solani and Ratmau Bridges. The Formation Level between the bridges should not have been lower than High Flood Level in the Solani plus four feet and preferably even higher than this.”

“Some students sited their first station from Roorkee beyond Ratmau River at Mile 6 or 7. This would lower the train capacity of the section Saharanpur-Hardwar the only subsequent remedy being a station at Mile 3 where the ground was unsuitable.”

“Reference to existing bridges in confirmation of formulæ used for water way was omitted by many students.”

“Deductions regarding depth of scour should also be confirmed where possible by actual observations. This was probably not practicable in the short time allotted to the Project but reference to the necessity of doing so would have earned marks.”

"The Design of the bridge was the point where most marks were dropped."

"The reasons for the rejection of the cheaper 40' spans was barely touched on. 40' spans being cheaper, even with a larger water way to construct the greater number of piers the selection of 60' spans could only be justified from local conditions, *e.g.*, the size of timber or trees carried by the river in flood."

"Calculations for the depth of well showed in many cases that wells deeper than 40' should have been used. Probably boulders would be encountered at 30' as in the bridge at Dausni and 40' wells were therefore safe but this was not stated by any student."

"Local pot holes round piers allowed for by some students could have been constructed by pitching round the wells. One student only noted this but failed to include the pitching required in his estimate."

"Students should pay more attention to producing a neat and accurate final abstract of cost under each head and sub-head. The cost of the line can then be seen at a glance and also those items which have an unusually large "Cost per mile"."

The 3rd year Civil Engineer Class students visited the following works during the session :—

- (i). Railway Institute Buildings and Sewage Disposal and Water-works, Dehra Dun.
- (ii). Headworks and River Training Works at Hardwar and Bhimgoda.
- (iii). Hydro-electric Power Station at Bhola.

The 2nd Year Civil Engineer Class Students visited :—

- (i). Construction of a new type of tube well at Piran Kalyar.
- (ii). Ramganga Pumping Works and Weir at Seohara.

A new type of brass strainer for tube-wells has been purchased this year. It is hoped in the ensuing session to prepare a detailed catalogue of the models and to eliminate such as no longer serve a useful purpose.

The experiments performed by Professor Salig Ram during the previous session on reinforced brick-work were published during the current Session, as were also the experiments of Professor Raja Ram on pressures on retaining walls.

A series of useful experiments on cement concrete utilising broken brick instead of stone was at the initiation of Professor Lacey carried on

throughout the Session in the laboratory of the Assistant Professor of Mechanical and Electrical Engineering to whose staff is due the credit of the considerable labour involved.

A current meter of the latest make has recently been purchased and joint discharge observations made with the canal department. It is hoped to purchase a new discharge boat as the old ones are worn out and to extend operations in this direction. The department has now purchased a cement-testing machine of latest make for purely departmental experiments, and it is hoped to build up in the near future a fully equipped laboratory without which experiments cannot be pursued to a successful conclusion.

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#### DEPARTMENT OF SURVEYING AND DRAWING.

As foreshadowed last year a new site for a Survey Camp was selected some 12 miles south of Roorkee which last year formed part of the field operations for the Final Project.

The ground proved to be intricate and well suited for teaching and instructional work. In spite of the very cold weather experienced under canvas, the health of the camp was excellent. There now exists a full competitive equipment for 36 students and year by year an increased accuracy in results is evident with the present type of instruments.—namely, the India Patterns of Levels and Theodolites.

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#### DEPARTMENT OF PURE AND APPLIED MATHEMATICS

\* The new syllabus, resulting from the adoption of a higher, uniform standard at entrance, was introduced this Session, and the results, so far as can be seen at present, appear satisfactory.

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#### DEPARTMENT OF MECHANICAL AND ELECTRICAL ENGINEERING.

During the Session the Department of Electrical Engineering was amalgamated with Mechanical Engineering. The Electrical Engineering Laboratory was moved to suitable quarters in the Workshops block, and is now fitted up and in working order. Various small additions to the plant of the department were made during the year, and, so far as funds permit, the equipment is kept up to date. The work of the Department has continued on the usual lines.

## DEPARTMENT OF APPLIED SCIENCE.

On the abolition of the Department of Electrical Engineering and Physics, the Physics Section was amalgamated with the work of the Chemical Department—now the Department of Applied Science. The old Electrical Engineering Laboratory was dismantled and then refitted as a Physics Laboratory. Certain other re-arrangements were made for improving the accommodation of the students and the housing of the apparatus, etc. The whole of the instructional work has been re-organised and brought into line with requirements attendant upon the introduction of a higher and more uniform standard at entrance. The full effect of this reorganisation will be felt next Session when all the necessary improvements will have been completed.

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## PHOTO. MECHANICAL AND LITHO. DEPARTMENT.

Orders have not been quite so numerous this year, consequently the receipts have fallen from Rs. 1,02,445/13/- to Rs. 86,802/5/-, compared with the previous year. Certain internal economies were made to meet the situation, necessitating a reduction of the temporary staff. The Department has been able to produce a reasonable profit.

The large map for the Punjab Irrigation Department which has been in hand for some time past was completed during the Session at a cost of Rs. 7,000/-. It was printed in colours from 50 carefully prepared zinc plates. The delicate and intricate work has met with the approval of the Punjab Government.

The Photographic reproduction work executed in connection with the United Provinces administrative report, and for the United Provinces Irrigation Department, has given every satisfaction.

The printing work, and particularly the production of the College Calendar, received a congratulatory note from His Excellency, the Viceroy, when he inspected the College.

The Department has recently been unfortunate in being deprived of the services of Mr. Peychers, the Assistant Superintendent, who had to proceed on leave through ill-health.

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## HEALTH.

The health of the students during the Session has been particularly good. The outbreak of plague in the Roorkee bazaar and cantonments,

and in many of the surrounding villages during the months of February to April, was met by increased vigilance of the Medical Staff. Prophylactic treatment was widely employed to meet the situation. This and other precautionary measures were successful in keeping the College lines free from this dreaded disease. Regular weekly sanitary inspections are carried out and the drinking water supply was frequently and carefully examined. Since there is always a shortage of potable water during the hot weather extra care has to be taken to prevent contamination of the drinking water supply. Effective anti-malarial measures were adopted in co-operation with the cantonment authorities, with satisfactory results.

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### ENGINEER CLASS MESS.

The dwindling numbers of European students entering the College render it increasingly difficult to keep the Mess going along the old lines. It is difficult now to make ends meet without largely increasing the daily messing charges, and radical changes in connection with the running of Mess are receiving very careful consideration.

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### ENGINEER CLASS INDIAN CLUB.

The Indian Club is in a flourishing condition and is becoming more and more an important and popular factor in the lives of the students in Roorkee. The students themselves take a very keen interest in its management under the guidance of the staff. The recent installation of electric light in the Club has been greatly appreciated.

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### MILITARY TRAINING.

Military training has been carried on steadily throughout the year, and the progress made is satisfactory. The University Training Corps has been equipped with service rifles. These rifles are stored in the Sappers and Miners Rifle Kot.

The A. F. I. in the College, being composed of students from the Engineer Class Mess, is dwindling in numbers from year to year. For training purposes they have been amalgamated with the University Training Corps.

After serving with the Corps since its inception in Thomason College, Major A. M. McLean, M.C., resigned his commission in February, 1929.

His resignation was accepted by the Headquarters, University Training Corps, with much regret. Major McLean has rendered valuable service in connection with the establishment of the Roorkee units. Lt. Crawford is now in charge.

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### BUILDINGS AND GROUNDS.

The following special repairs were carried out during the year :—

- (a). *College Main Building.*—Owing to subsidence due to a leakage of an underground main drain, it was necessary to re-build a small corner of the Press and Photo. section at a cost of Rs. 2,298/-.
- (b). *College Dairy.*—The remaining cowshed was re-roofed with Allahabad Tiling borne on Steel Trusses replacing very old fashioned country tiles on bamboo mats and frames. Cost Rs. 1,274/-. The cowsheds are now complete and in very good and sanitary condition.
- (c). *Sanitary Department.*—The College bullock-shed was also re-roofed with jack-arches borne on R. S. joists replacing old country tiles laid over Sal bully trusses. Cost Rs. 1,278/-.
- (d). *Roads.*—The coaltarring of roads which was commenced last year has been carried further. This method of keeping grass down is proving economical, and government repair money which had to be spent for the removal of grass will, it is hoped, be available for the many repairs to buildings which are required from time to time.

*Residential Buildings.*—There still remain 3 thatched bungalows in the College Estate and the Annual Repairs on these buildings are naturally very heavy. The sanction of Government and allotment of funds for re-roofing with jack-arches are patiently awaited. In the meantime the white ants continue to attack the timber and thatching grass which is provided annually in the shape of repairs.

*Water-supply.*—This question still remains a vexing one and until an allotment is granted to augment the present supply, the scarcity of water during the hot months is likely to continue.



### RECREATION.

Activities on the playing fields have in no wise diminished. All games have been well supported, both by students and the staff. The Athletic Sports held in December were as successful as usual : all events were keenly contested. The introduction of a Cross Country race was very popular and caused much enthusiasm. Hockey and football continue to attract large numbers and tennis and squash racquets are as popular as ever. A feature of the Regatta which was held in June was the keenness of the First year students who contested every event in a manner that lead one to expect them to give a good account of themselves next year.

### STUDENTS APPOINTMENTS

The 26 qualified students of Civil Engineer Class were posted as follows after the completion of the courses in July, 1928 : —

Punjab Irrigation,	... Chunni Lal Handa, Ram Lal Khanna, Azid Bakhsh, Hari Chand Kalra, Shiv Nath, B. Sc., Dharam Pal Sondhi, Diwan Chand Bahl & Mir Abdur Rahim.
Punjab Buildings and Roads,	Bikram Jit and Krishan Lal Bansal.
C. P. Buildings and Roads, ...	Qurban Singh, Surendra Nath Tripathi. Daya Ram Yadava, B. Sc., Krishnanand Dua, Mohd. Naiman Ansari and Charanjit Lal Malhotra.
U. P. Buildings and Roads, ...	Reginald Wray Wilson, and Shiva Shanker Sharma.
United Provinces Irrigation.	Yadava Mohan, Harnandan Prasad Sinha, Jainti Prasad Jain, Raghubir Saran Jain, Shiam Sunder Lal, Wilfred Ronald Fleury, Percy Harold McLean, & Izhar Ali Abbasi.

### THOMASON CIVIL ENGINEERING COLLEGE.

#### PRIZE DAY.

The annual convocation and Prize distribution took place at 11 a.m. on Saturday, the 13th July. The Hon'ble Raja Bahadur Kushalpal Singh, Minister for Education, United Provinces, presided. Among the distinguished visitors present were H. R. Harrop, Esq., M.L.C., Direc-

tor of Public Instruction; Lt.-Col. Martel, D.S.O., M.C., R.E., Khan Bahadur. A. H. Mirza and Saiyid Tufail Ahmed, M. L. C.

The Officiating Principal in opening the proceeding said :—

• RAJA BAHADUR, LADIES AND GENTLEMEN—

To-day is a special occasion in the history of the College, since it is the first time that the Hon'ble Minister for Education has been able to come to Roorkee to preside at our Annual Convocation. It is, therefore, gratifying to us, that you, Sir, amid your manifold duties have been able to visit us, to show your sympathetic interest in our activities, and to obtain some first-hand knowledge of the work of our Institution. On behalf of the staff and students, it is, therefore, my privilege to extend to you, Sir, a very hearty welcome; and as your visit to us must of necessity be of short duration, and since there are many ramifications to the work here, we hope we may have other pleasurable opportunities of welcoming you in Roorkee in the future.

We likewise are grateful to those official and non-official gentlemen, who, too, are keenly interested in the College, and who are ever willing to give us their counsel and support. On behalf of the Staff and Students, I tender them also our very cordial thanks for honouring us with their presence to-day.

Before proceeding briefly to review the work of the past session, one or two features of the year now drawing to a close call for special comment. In the first place, it is a matter of general satisfaction to be able to record that, despite the abolition of guaranteed appointments, public interest and support of the Thomason College shows no signs of falling off. There has been, for instance, a steady increase in the number of applicants seeking admission. For the 70 vacancies offered in June—30 in the Civil Engineer Class and 40 in the Overseer Class,—there were no fewer than 537 registered applicants who were qualified to sit for the entrance examinations, which, as you know, are held simultaneously in seven centres for the convenience of the candidates. We are, therefore, able to select some of the best men available from the Colleges and Schools, and train them for careers of usefulness and service; and the demand for Roorkee trained men is such that we are able to find employment for all who satisfactorily complete the course. Moreover, we are able to report that six Roorkee trained men, who left the College last year, were

selected in open competition for employment in the Indian Service of Engineers and we hope that many of those who are now passing out will be just as successful in this respect. So long as the standard of training remains as high as it is at present, there is little doubt these successes in the way of I. S. E. appointments will continue.

One of the secrets of the success attained by this College is to be found in the manner in which all the staff co-operate in the various sections of the work, both in the class room and on the playing fields. A proper spirit of keenness and enthusiasm is kept alive throughout the institution, and it is no formal thing when I express my deep gratitude to the Staff for their real, whole-hearted support.

During the past session there have been few changes in the Staff. We regret the absence of Colonel Sandes ; the more so on account of the fact that he had to leave us suddenly in May through ill-health, and we are glad to receive the latest report that he is quite fit again. Mr. Mohsin Ali joined us at the beginning of the Session from the United Provinces Irrigation Department, and replaced Mr. Salig Ram as one of the Professors of Civil Engineering, and we hope he will be able to remain with us for the full period of his transfer. We have lost the services of Mr. F. J. Smith, Lecturer in Drawing, who retired in March last, after having rendered the College 31 years of faithful service. Our very best wishes follow him in his retirement, and we sincerely hope he may be able to enjoy his well earned leisure with his family for many years to come.

The Department of Electrical Engineering and Physics which had been in existence many years, was abolished in accordance with the recommendations of the special Committee appointed by Government, and the work divided up. The Electrical Engineering Section has been transferred to the Workshops, and placed under the charge of Major McLean, while the work in Physics has been incorporated with that of the Chemical Department. The laboratories both for Physics and Electrical Engineering have been entirely remodelled, and the changes effected have enabled the Surveying Department to make better provision for their laboratory work, and for the better housing of their valuable instruments.

Early in the year the College residential quarters were provided with electric light, and this has proved a great boon to all concerned. The

actual carrying out of the scheme was long delayed owing to the difficulties experienced by Government in finding the necessary funds, but now the College has been linked up with the Bahadrabad Hydro-Electric station, we are all very grateful to Government for being able recently to provide the requisite money, and to Major McLean for his capable handling of the electrical project. We are still hopeful about our water supply scheme which has also long been held up owing to lack of funds, but we trust that, in due course, the money for this essential will likewise be forthcoming, so that the difficulties we experience each hot weather in providing an adequate supply of drinking water, will disappear.

Military training is making satisfactory progress under Lt. Crawford who took over command of the University Training Corps units from Major McLean. Major McLean has been responsible for the development of the University Training Corps from the commencement of the movement in Roorkee. Our thanks are due to both these officers for the efficiency attained by the College Sections of the U. T. C. and A. F.

The health of the students has been particularly good throughout the year. Plague was prevalent in the bazaar and in the surrounding villages in February and March, yet no case occurred among the students or staff. Naturally all precautionary measures were taken, including an extensive application of the prophylactic treatment, and the College Medical Staff are to be congratulated on the happy results of their labour in preventing the disease from entering College lines.

Discipline has been good, but the maintenance of a high standard of discipline is, of course, a feature of the College, and, therefore, no further comment is needed.

The work of the year, on the whole, has been as successful as in former years. At one time a certain slackness was noticeable in one class, but the members of that class subsequently made strenuous efforts to retrieve the situation, and succeeded to a considerable extent, but they no doubt made the discovery that steady application throughout the session is preferable in the end, and produces better results at less trouble to all concerned.

Coming now to the list of prize winners, the Council of India Prize of Rs. 1,000/-, awarded to the most distinguished student of the Civil Engineer Class passing out this year goes to Mr. Dharam Chand Bajjal, who also carries off the Medals in Descriptive Engineering, Applied Mechanics, and Surveying. We congratulate him very heartily

on his success. He has won and maintained his position by hard work in the face of severe competition. Mr. Mulk Raj Chopra is likewise to be warmly congratulated in having secured the honour of Second place, and in winning the MacLagan Prize for Electrical Engineering and Physics, and the medal for Mechanical Engineering. The third place in order of merit has been gained by Mr. Des Raj Khanna who thus secures the Rai Bahadur Kanhya Lal Gold Medal, and he too is to be cordially commended.

The Project prize is looked upon as one of the most important prizes of the year, inasmuch as it tests the students ability to apply his knowledge to practical Engineering problems. This year, the major project involved the construction of a single line of railway from Roorkee to Hardwar—a project which will, in all probability, be carried out in the near future by the Railway Board to meet the competition of motor traffic by road. Mr. R. H. Goodman is to be very highly commended in carrying off the blue-ribbon award—The Thomason Memorial Gold Medal for the best Engineering design—with an aggregate of 77.8 % of the total marks. Mr. D. R. Khanna is also to be congratulated on the creditable achievement of gaining second place with 72.5 %, and Mr. P. S. Bhatnagar third place in order of merit with 71.1 % of the marks. The Project examiner (Mr. Michael) in his report states that “the work submitted was of a high average standard, particularly in Surveying and Drawing.” Mr. Michael’s report concludes with various valuable hints and practical advice which cannot be dealt with here. A copy of the report has been placed on the College notice board and is worthy of close study by all the students. Our best thanks are due to Mr. Michael for all the care he has bestowed upon setting and marking the project.

In the Civil Engineer Class 3rd Year, there is, I regret to report, one failure. There is also one failure in the 2nd Year. All the students of the 1st year pass. In the 3rd Year, 15 secure the higher certificate.

In the Overseer Class all pass in the 2nd Year and 16 students gain the higher certificate. Five failures are recorded in the 1st year. There is, however, an all round improvement in the standard of work in the Overseer Section. Shiv Sharan Swami, who stands first, and wins the prize of Rs 100/- and the Silver Medal for General Merit ; and Nathu Mal Jain, who stands 2nd on the list, are both to be commended on the results of their work. The Overseer Class project prize goes to R. D.

Pande : N. D. Pujari gains 2nd place. These students also are to be congratulated.

The importance of games and athletics for those training for out-door life, is effectively recognised throughout the College, and has frequently been mentioned in Convocation addresses. Activity in this direction helps in the formation of character and also helps to lay the foundation of a healthy constitution. Much keenness has been evinced in this Section of the work during the past Session. Mr. D. V. Ghosh won the College Championship in the Athletic Sports and thereby secured the Lion Trophy and the Silver Cup given by Colonel Sandes. Dhara Singh was second. Mr. Ghosh also won the Cross-Country Championship and gained thereby the Bradshaw-Smith Cup. This year the competition between the Civil Engineer Class and the Overseer Class has been very close, and we congratulate both these students on their successes. The Vizianagram Cup, awarded to the best Indian Athlete in the 3rd Year Civil Engineer Class, has, on this occasion, been won by Mr. Balwant Singh Nag to whom we offer our cordial congratulations.

The cup for lawn tennis singles was won by Mr. P. N. Gadi ; and the cup for tennis doubles goes to Messrs. S. R. Mehta and S. L. Sahgal. Mr. S. D. Sinha won the Squash racquets singles Championship and Messrs. S. D. Sinha and S. N. Wadhwa the Squash doubles and the Silver Cup given by Professor Puri. All these students are to be congratulated on their success.

A feature of the regatta this year was the keenness shown by the 1st year students, who, on many occasions, very nearly beat older and more experienced crews. We expect the first year to give a good account of themselves during the forthcoming Session. The boating cup goes to Mr. D. R. Kohli ; the pair oars to Messrs. Varma and Banerjee. The K.G.O. 1st Sappers and Miners' Cup for double Sculls was won by Messrs. Kohli and Mehta. Messrs. Har Dyal, S. L. Bazzaz, S. K. Banerjee and R. K. Varma of the 2nd Year Civil Engineer Class secured the trophy for the Challenge fours. All these students deserve to be commended.

The Harcourt Butler Cup awarded annually to the student possessing the best record of work and play goes this year to Mr. Balwant Singh Nag. Our heartiest congratulations are offered to Mr. Balwant Singh Nag on his success.

In the Olympic contest this year the K. G. O. 1st Sappers and Miners were again successful. The contest was very keen indeed, and the College only lost by one point, the final score being K.G.O. 1st Sappers and Miners 13 points the College 12. During the contest we were pleased to see that the President, Recreations, is still able to keep his end up at the wicket, and we congratulate both Professor Veale and Mr. Rao for winning the prizes given for scores over 50 made in matches. We congratulate Mr. Webb also, in securing the batting and bowling prize.

One more Session has passed, and the eyes of most of those present are now directed towards the vacation. Holidays are sweeter after labour, and both staff and students are looking forward to a period of recuperation after 9 months strenuous application. The mistake is sometimes made by those not very familiar with the College in thinking that the work of both staff and students in Roorkee can be measured merely by the periods set down in the time tables. All students here are in residence and the corporate life of the College involves both staff and students in many activities outside the class-room, in fact, these outside activities, in which both staff and students are associated, are just as important as work in the class-room, and contribute in a large measure to the success of the institution.

Most of the students here will return again to us after the holidays. To the Seniors, however, to-day's proceedings remind you, if any reminder were necessary, that your College days are over. You are now equipped to embark on your careers as engineers, and you take with you the best wishes from us all. In the years to come you will look back upon many happy days spent at Roorkee in the company of friends, now about to be scattered over this great country. Never lose sight of the traditions of your College; earn a reputation for reliability, diligence and trustworthiness, play the game throughout life as you would on the playing fields in Roorkee, and then success will be yours.

The Hon'ble Raja Kushalpal Singh spoke as follows:—

DR. PHILLIPS AND OTHER MEMBERS OF THE STAFF—

I thank you most sincerely for the kind and hearty welcome which you have given to me. I need hardly tell you how glad I am to have been able to avail myself of Col. Sandes' invitation to visit this up-to-date and unique institution. It is a matter of great regret to me that

illness has compelled him to proceed on leave out of India. But it gives me pleasure to learn that he is quite fit again. I take this opportunity of expressing my appreciation of the zeal and devotion with which you have applied yourselves to your duties. It is particularly satisfactory to find evidence of enthusiasm and keenness everywhere in this institution. I was greatly struck with the bearing and smartness of the students and the general air of briskness. The whole tone of the College reflects high credit on both the staff and the students. What strikes one is the orderly, systematic and well-organised manner in which this institution is managed. It is, no wonder, that the students are attracted to this institution in large numbers and experience no difficulty in finding suitable employments. The popularity of the institution proves the usefulness of the instruction imparted here.

The praise bestowed on Lt. Crawford and Major McLean for the military training given to the students is well-deserved.

In my official capacity as the head of Government in the Education department, I am, in duty bound, to be interested in the well-being of this distinguished institution, but it is owing to its acknowledged and undoubted utility to the country that it has a warm place in my heart. I have great regard for this institution which turns out a most useful class of men. It has a brilliant record associated with illustrious names of enduring fame. The late Sir Ganga Ram whose labours have shed lustre upon the country was an alumnus of this institution. It is this institution which has supplied a body of distinguished engineers whose ability and integrity have been the theme of universal admiration and have vindicated the capacity of our countrymen for high offices in the State. I sincerely hope that this institution will be the seed-plot from which will spring the distinguished galaxy of eminent men whose notable achievements in the domains of irrigation, means of communication, and public works, will evoke in no unstinted measure the approbation of the public opinion.

It is my pleasant task to congratulate the prize-winners on the prizes they have won. I extend to them my sincere wishes for their further success in life.

Students of the College, I heartily congratulate you on the attainment of distinction for which you worked so hard. You have given good account of yourselves in athletic sports. You have invigorated



your bodies by physical exercises and thus fitted yourselves for an arduous life which your profession requires you to lead. Your calling is recognised among the noblest. Yours is a heaven-appointed task, a divine mission. It will be through you that irrigation works, so vitally necessary for the agricultural industry and consequent well-being of the nation, will be maintained and carried out. It will be through you that railway lines and metalled roads, so absolutely necessary for the development of trade and resultant prosperity of the country, will be kept in repair and constructed. It is clear from the Principal's review of the work of the past session that you have had a very strenuous time. One who leads an arduous life of toil and effort is bound to succeed in life. Your first duty is to yourself. Men are not ordinarily impelled by a consideration of other people's interests. Raise yourselves to positions of affluence by force of character and ability. As pointed out above, the very nature of your work is such that while success in your profession brings you wealth and fame, it advances the high interests of the country as well. It should be your sacred duty to achieve success in your profession. Your success will facilitate economic uplift and by your work the future progress of the country will be shaped. The economic condition of our country has to be improved. If you are successful in your profession, you can play an important and effective part in that great task. Strive after great things and believe yourselves capable of them. Follow the example of the late Sir Ganga Ram whose life will be a great inspiration to you. If you will cultivate self-reliance, do your work with vigour, energy and earnestness and develop your capacity for undertaking great enterprises, the success in life will assuredly be yours.

I thank you again for your kind reception and wish you all good fortune and success.

We have the pleasure of the presence of the Director of Public Instruction who takes a real interest in this institution.

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I have the honour to be,

Sir,

Your most obedient servant,

P. P. PHILLIPS, PH. D., F.I.C., I.E.S.,

*Offg. Principal.*



TABLE II.  
Civil English and Indian candidates from 1880 to 1928.

Provinces.	Came up for the examination.					Passed the Entrance Examination.					Passed the Final Examination.					Total of all classes.		
	Engineer Class.	Upper Subordi- nate Class.	Lower Subordi- nate Class.	(Overseer Class.	Mechanical and Electrical En- gineer Class.	Engineer Class.	Upper Subordi- nate Class.	Lower Subordi- nate Class.	Overseer Class.	Mechanical and Electrical En- gineer Class.	Upper Subordi- nate Class.	Lower Subordi- nate Class.	Mechanical and Electrical En- gineer Class.	Overseer Class.	Came up.	Passed the Entrance.	Failed out.	
United Provinces, ...	1679	1693	2867	1021	24	722	820	1481	380	8	380	502	715	25	173	7284	3411	1795
Punjab, ...	1315	1440	3210	21	3	518	642	1766	3	3	294	319	918	9	2	5989	2932	1542
North-West Frontier, Bengal.	17	7	11	3	2	7	2	7	...	1	2	2	4	2	...	40	17	10
Bombay, ...	109	56	6	...	2	38	10	1	...	...	40	9	...	...	...	173	49	49
Bombay, ...	14	10	2	...	2	6	3	2	...	...	7	...	1	2	...	28	12	10
Madras, ...	8	4	...	...	...	3	...	...	...	...	3	...	...	...	...	12	3	3
Central Provinces, ...	49	30	10	...	...	12	5	2	...	...	8	1	...	...	...	89	19	10
Burma, ...	14	...	...	...	...	5	...	...	...	...	4	...	...	...	...	14	5	4
Assam, ...	...	4	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Central India, Rajputana.	6	6	12	2	2	...	...	6	1	1	1	...	5	1	...	28	10	7
Baluchistan, Native States,	26	19	16	8	1	...	3	5	...	...	6	2	3	...	1	70	16	12
Private, England, Behar and Orissa, ...	2	8	5	...	...	...	5	4	...	...	...	2	1	...	...	15	9	3
Delhi.	68	155	485	17	...	24	56	235	57	1	11	26	142	1	3	727	373	183
	2	31	108	...	...	...	10	37	...	...	...	4	21	...	...	141	47	25
	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	...	...
	35	...	...	...	1	10	...	...	...	...	5	...	...	...	...	36	10	6
	43	1	1	5	1	9	...	1	1	...	8	2	3	1	...	51	11	14
Total,	3389	3464	6733	1077	40	1364	1556	3547	442	13	769	869	1814	42	179	14703	6924	3673

TABLE III.

*Comparative statement showing numbers in College on 1st April of each year.*

Name of class.	1925.			1926.			1927.			1928.			1929.		
	British.	Indians.	Total.	British.	Indians.	Total.	British.	Indians.	Total.	British.	Indians.	Total.	British.	Indians.	Total.
Civil Engineer Class,	9	77	86	10	78	88	6	79	85	9	81	90	3	90	93
Apprentice Overseers,	...	6	6	...	16	16	...	2	2	...	7	7	...	9	9
Overseer Class,	...	82	82	...	81	81	...	79	79	...	78	78	...	73	73
Draftsman Class,	...	26	26	...	34	34	...	34	34	...	23	23	...	17	17
Salt Department Class,	...	...	...	...	...	...	...	1	1	...	...	...	...	...	...
Total,	9	191	200	10	209	219	6	195	201	6	189	195	3	189	192



TABLE V.

*Comparative statement showing the transactions of the various College funds from 1st April, 1927 to 31st March, 1929—  
the property of the funds is included.*

Name of fund.	Balance on 1st April, 1928.		Receipts during the year 1928-29.		Total.		Expenditure during the year 1928-29.		Balance on 31st March, 1929.	
	Rs.	A. P.	Rs.	A. P.	Rs.	A. P.	Rs.	A. P.	Rs.	A. P.
<i>Engineer Class.</i>										
Mess, ...	1,208	15 7	5,118	13 5	6,327	13 0	6,008	5 1	319	71 1
Recreation, ...	1,643	1' 2	10,874	15 3	12,518	10 5	11,051	11 6	1,466	14 11
Indian Engineer Class Club, ...	451	4 6	4 546	7 3	4,997	11 9	4,046	7 11	951	3 10
<i>Overseer Class.</i>										
Recreation, ...	358	11 9	1,531	14" 1	1,890	9 10	1,523	6 0	367	3 10
Reading-room, ...	115	10 4	577	10 3	693	4 7	574	2 0	119	2 7
<b>Total,</b> ...	<b>3,778</b>	<b>5 4</b>	<b>22,649</b>	<b>12 3</b>	<b>26,428</b>	<b>1 7</b>	<b>77,204</b>	<b>0 6</b>	<b>3,224</b>	<b>1 1</b>

TABLE VI.

Statement showing the number of candidates registered and the number who have obtained employment during 1924 to 1928.

Grade.	1924.		1925.		1926.		1927.		1928.	
	Registered.	Appointed.	Registered.	Appointed.	Registered.	Appointed.	Registered.	Appointed.	Registered.	Appointed.
Engineers,	1	...	4	1	2	...	...	...	2	...
Upper Subordinates,	1	...	...	...	2	...	...	...	...	...
Overseers,	18	18	12	9	37	37	33	31	35	31
Lower Subordinates,	3	2	36	...	2	4	2	8	2	1
Surveyors,	...	...	4	...	...	...	...	...	...	...
Draftsmen,	...	...	8	...	4	...	7	2	7	4
Estimators,	...	...	...	...	...	...	...	...	...	...
Mistris,	...	...	...	...	...	...	...	...	...	...
Drivers,	...	...	1	...	1	...	...	...	...	...
Tracers,	...	...	...	...	...	...	...	...	...	...
<i>Industrial Classes.</i>										
Press Workers, I.,	2	...	...	...	...	...	...	...	...	...
Photo-Mechanical, II.,	...	...	...	...	...	...	...	...	...	...
Total,	25	20	65	10	48	43	43	36	45	36

TABLE VII.

Statement showing applications and appointments of candidates during year 1928.

Grade.	Railways.	Military Works.	United Provinces.				Punjab.				North-West Frontier Province.	Burma.	Local Administration.					Native States.	Total.
			Provincial.	Irrigation.	Municipal and District Board.	Miscellaneous.	Provincial.	Irrigation.	Municipal and District Board.	Miscellaneous.			Assam.	Bihar and Orissa.	Central Provinces.	Kajputana and Central India.	Aden.		
<i>Applications from employers.</i>																			
Engineers, ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Upper Subordinates, ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Overseers, ..	1	1	1	3	2	..	..	8	..	..	..	..	..	..	3	1	..	..	20
Lower Subordinates, ..	..	7	3	24	5	..	..	3	..	..	..	..	..	..	1	1	..	..	45
Draftsmen, ..	3	..	..	1	4	..	..	4	..	..	..	..	..	..	..	..	..	..	14
Mistries, ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Press Workers, ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Photo-Mechanical operators, ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	4
Total, ..	4	8	4	28	11	..	..	15	4	1	..	..	..	..	4	2	..	..	83
<i>Appointments through College.</i>																			
Engineers, ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Upper Subordinates, ..	..	4	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..
Overseers, ..	1	..	2	2	..	..	..	1	..	..	..	..	..	..	..	..	..	1	31
Lower Subordinates, ..	..	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	1
Draftsmen, ..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	4
Mistries, ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Press Workers, ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Photo-Mechanical operators, ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Total, ..	3	4	2	22	2	..	..	1	..	..	..	..	..	..	..	..	..	2	96



*Statement showing the expenditure of the Thomason College, Roorkee for  
the year 1927-28 under 31-Education (Provincial).*

<b>(a).—College Department :—</b>						
1.	Pay of Officer, Voted,	...	...	...	1,34,393	0 0
	Non-Voted,	...	...	...	58,729	0 0
2.	Pay of Establishment,	...	...	...	59,314	0 0
3.	Allowances and Honoraria Voted,	...	...	...	2,743	0 0
	Non-Voted,	...	...	...	546	0 0
4.	Cost of passages, Non-Voted,	...	...	...	6,511	0 0
5.	Supplies and Services,	...	...	...	76,176	0 0
6.	Contingencies,	...	...	...	27,247	0 0
7.	Grant-in-aid contribution, etc.,	...	...	...	...	...
	Non-Voted,	...	...	...	1,200	0 0
Total College Department Voted,				...	2,99,873	0 0
Non-Voted,				...	66,986	0 0
<b>(b).—Photo-Mechanical and Lithographic Department :—</b>						
1.	Pay of Establishment,	...	...	...	40,040	0 0
2.	Allowances and Honoraria,	...	...	...	...	...
3.	Supplies and Services,	...	...	...	33,803	0 0
4.	Contingencies,	...	...	...	3,756	0 0
Total Photo-Mechl. Department				...	77,599	0 0
Deduct contribution from other Governments for Training of students,				...	1,25,975	0 0
Total Civil Engineering College Voted,				...	2,51,497	0 0
Non-Voted,				...	66,986	0 0
<b>(c). Civil Engineering College Book Depot :—</b>						
1.	Pay of Establishment,	...	...	...	288	0 0
2.	Supplies and Services,	...	...	...	16,422	0 0
Total,				...	16,710	0 0
<b>(d). Scholarships. .... Separate figures not available.</b>						

*Statements showing the Receipts of the Civil Engineering College,  
Roorkee, for the year 1927-28 under XXI., Education  
(Provincial).*

<i>A. University.</i>			
1. Fees, Civil Engineering College, Roorkee,	...	32,264	0 0
<i>Miscellaneous.</i>			
2. Examination fees, Civil Engineering College, Roorkee,	... ..	7,260	0 0
3. Sale proceeds of Books, Civil Engineering College, Roorkee,	... ..	21,959	0 0
4. Workshop Manufactures,	... ..	7,579	0 0
5. Photo. and Lithographic Department Receipts,	...	1,00,448	0 0
6. Rents of Buildings, .....	Separate figures not available, ...	...	...
7. Miscellaneous, .....	Separate figures not available, ...	...	...

*Statement of the annual accounts of the Thomason College  
Workshops for the year 1927-28.*

Receipts.	Amount.	Expenditure.	Amount.
	Rs. A. P.		Rs. A. P.
Manufacture, ..	5,717 0 9	Salaries of Assistant Professor of Mechanical Engineering, ..	11,921 0
Other items, ..	0 0 0	Salaries of 1st and 2nd Lecturers in Mechanical Engineering, ..	9,395 4 0
		Salaries of Mechanical Draftsman, ..	1,320 0 0
		Salaries of Foremen and Assistant Foremen, ..	10,860 10 0
		Salaries of Store-keeper, ..	420 0 0
		Salaries of Survey Mistry, ..	780 0 0
		Salaries of Stoker, 218-10-0	698 10 0
		Salaries of Mistry (Water-Works), 480-0-0	
		Salaries of Menials (Workshop Guards), ..	1,026 0 0
		Travelling allowance, ..	156 8 0
		Manufacture —	
		Labour, ..	1,132 9 6
		Direct charges to Works, ..	0 0 0
		Stock, ..	4,492 6 9
		Tools and Plant (Workshop Machines), ..	999 10 0
		General charges, ..	0 0 0
		Miscellaneous, ..	12,832 4 6
		Generating Station charges, ..	11,998 2 3
		Laboratory and Class charges, ..	4,488 15 6
		Workshop Practice, ..	4,999 11 4
Total, ..	5,717 0 9	Total, ..	77,521 12 3

*Manufacture Account.*

(Including credit sales of Stock and Instruction charges for students).

Unrealised balance brought forward, ..	1,411 15 2	Cash Receipts, ..	5,717 0 9
Direct charges to Works, ..	0 0 0	Stock Returns, ..	0 0 0
Labour, ..	1,132 6 0	Unrealised balance carried forward, ..	478 2 5
Stock (including Credit Sales), ..	3,688 5 9		
Profit (on private works only), ..	12 8 3		
Total	6,195 3 2	Total	6,195 3 2

*Statement of the annual accounts of the Thomason College  
Workshops for the year 1927-28.*

Receipts.	Amount.	Expenditure.	Amount.
<i>Labour Account.</i>			
	Rs. A. P.		Rs. A. P.
Payments during the year,	1,141 13 0	Opening Balance, ..	106 10 0
Closing Balance, ..	97 3 0	Wages for the year, ..	1,182 6 0
Total, ..	1,239 0 0	Total, ..	1,239 0 0
<i>Stock Account.</i>			
Opening Balance, ..	10,335 9 10	Issues to Works (including credit sales), ..	3,638 5 9
Cash Purchases, ..	4,492 6 9	Closing Balance, ..	11,189 10 10
Returns from Works,	0 0 0		
Total, ..	14,828 0 7	Total, ..	14,828 0 7
<i>Tools and Plant (Workshop Machines) Account.</i>			
Opening Balance including Weir Feed Pump,	1,16,985 10 0	Depreciation, ..	12,986 9 0
		Closing Balance, ..	1,03,999 1 0
Total, ..	1,16,985 10 0	Total, ..	1,16,985 10 0



## V. P. Sales Account.

	Rs.	A. P.	Rs.	A. P.	Realized during the year, Closing balance,	Rs.	A. P.	Rs.	A. P.
Opening balance,	..	221 6 0	..	..	..	9,827 8 0	..	..	..
Issues during the year,	..	9,883 2 0	..	..	..	277 0 0	..	..	..
Total,	..	..	10,104 8 0	..	Total,	..	..	10,104 8 0	..

## Credit Sales Account.

	Rs.	A. P.	Rs.	A. P.	Realized during the year, Closing balance,	Rs.	A. P.	Rs.	A. P.
Opening balance,	..	..	..	..	..	1,089 10 0	..	..	..
Issues during the year,	..	1,179 13 0	..	..	..	30 3 0	..	..	..
Total,	..	..	1,119 13 0	..	Total,	..	..	1,119 13 0	..

## Capital, 1927-28.

<i>Balance on 1st April 1927.</i>		Rs.	A. P.	Rs.	A. P.	Rs.	A. P.
Stock,	..	49,261	13 6	..	..	32,969	4 8
Tools and Plant,	..	69,147	9 5	..	..	3,749	4 1
Unfinished work,	..	5,000	14 0	1,23,410	4 11	..	..
Stock purchased during the year,	..	29,993	2 9	..	..	..	..
Tools and Plant purchased during the year,	..	3,997	7 3	33,990	10 0	46,285	11 7
Value of unfinished work at the end of the current year,	..	..	..	4,544	8 0	69,395	12 7
	..	..	..	..	..	7,262	11 0
	..	..	..	..	..	1,22,944	3 2
Total.	..	..	..	1,61,945	6 11	..	..
	..	..	..	..	..	1,61,945	6 11

## Revenue 1927-28.

		Rs.	A. P.	Rs.	A. P.	Rs.	A. P.
To Establishment Salaries,	..	38,859	13 0	..	..	..	..
Contingencies and T. A.,	..	4,199	11 6	43,059	8 6	1,02,445	13 6
Pay of 3 Clerks and 1 Assistant Press paid from College,	P.-M.	..	..	6,058	2 0	1,598	7 0
Stock received from Capital,	..	32,969	4 8	..	..	..	..
Depreciation of Tools and Plant,	..	3,749	4 1	36,718	8 9	4,544	8 0
Unfinished work of previous year billed for during the year,	..	..	..	2,282	11 0	..	..
Pensionary charges as per No. F/1308/I-15, dated 16th July, 1925 from D. P. I., U. P., Allahabad,	..	..	..	3,438	12 0	..	..
Profit,	..	..	..	16,961	2 3	..	..
Total.	..	..	..	1,08,518	12 6	..	..
	..	..	..	..	..	1,08,518	12 6

D. D. MEHTA,

Superintendent, Photo-Mechanical and Litho. Department,

Thomason Civil Engineering College, Roorkee.













